

# Asthma

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Asthma has been characterized as being epidemic in the United States. According to the Centers for Disease Control (CDC), asthma affects almost 20 million people in America, of which almost 9 million are children. Ten million Americans suffer specifically from allergic asthma. More than 70 percent of people with asthma also suffer from allergies. Asthma and allergies affect one out of four Americans.

Asthma accounts for one-fourth of all emergency room visits in the U.S., and approximately 44 percent of all asthma hospitalizations are for children. There are approximately 5,000 deaths from asthma each year. Every day in America 40,000 people miss school or work, 30,000 have an asthma attack, 5,000 people visit the emergency room, 1,000 people are admitted to the hospital and 11 people die due to asthma.

Asthma affects all ages, races, ethnic and socioeconomic populations, but low-income and minority groups experience substantially higher rates of fatalities, hospital admissions and emergency room visits. Asthma prevalence is 39 percent higher in African Americans than whites. Women have a 35 percent greater prevalence rate than men. Studies have also shown the greatest incidence of the disease among low-income populations.

Asthma is the most common chronic disorder in children and adolescents. There are about 9 million individuals 18 years and younger who have asthma. Included in this number are an estimated 1.3 million children under the age of five years. In children four years or younger, the

prevalence increased 160 percent from 1980 to 1994, and from 1980 to 1993, the death rate from asthma nearly doubled among persons 5 to 24 years. In children younger than 15 years, asthma accounts for 3 million physician visits, 570,000 emergency department visits, 164,000 hospital stays, 8.7 million prescriptions and 10 million missed school days per year. Children with asthma miss about three times more school than children without asthma.

Children breathe more air, eat more food and drink more liquids in proportion to their body weight than adults. Their developing bodies may be more susceptible to environmental exposures than adults. In a typical day, children may be exposed to a wide array of environmental agents at home, in school and while playing outdoors.

## Pathophysiology

Asthma is a chronic lung condition with ongoing airway inflammation that results in recurring acute episodes (attacks) of breathing problems, such as coughing, wheezing, chest tightness and shortness of breath. These symptoms occur because inflammation makes the airways overreact to a variety of stimuli including physical activity, upper respiratory infections, allergens and irritants.

During the normal breathing process, the body takes in air through the mouth and nose. The fresh air, which is rich in oxygen, flows through the windpipe into all of the airways until it reaches the tiny air sacs in the lungs, where the oxygen is exchanged

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for carbon dioxide. The air breathed out is stale, meaning it is high in carbon dioxide, the waste gas of the body.

During an asthma attack, the airways are constricted and it is difficult to get air into and out of the lungs. Blood tests are often used during a severe asthma attack to monitor blood oxygen and carbon dioxide levels.

This chronic disease of the lungs is characterized by episodes, or attacks, in which the airways over-react to certain factors called triggers. During an asthma attack, the branches of the windpipe, called bronchi, react in three ways: the linings swell, the surrounding muscles tighten and mucus glands in the walls produce excess mucus. All of which block the flow of air.

Symptoms can be mild or severe and can include one or more of the following:

- **Coughing** – the lungs’ attempt to dislodge mucus. People with asthma feel their symptoms would subside if they could cough up enough mucus, but this is rarely possible.
- **Wheezing** – a whistling noise when breathing caused by air moving through the narrowed airway.
- **Chest tightness** – the feeling that the chest is being squeezed or that a weight is sitting on it.
- **Shortness of breath** – the result of too many swollen, plugged airways.

Other symptoms can include:

- Excess mucus – restricted breathing caused by thick mucus clogging airways
- Fatigue – easily tired, which can be caused directly by symptom or indirectly because other symptoms are interfering with sleep
- Inability to speak loudly or in full sentences

Signs of asthma in infants and small children can include:

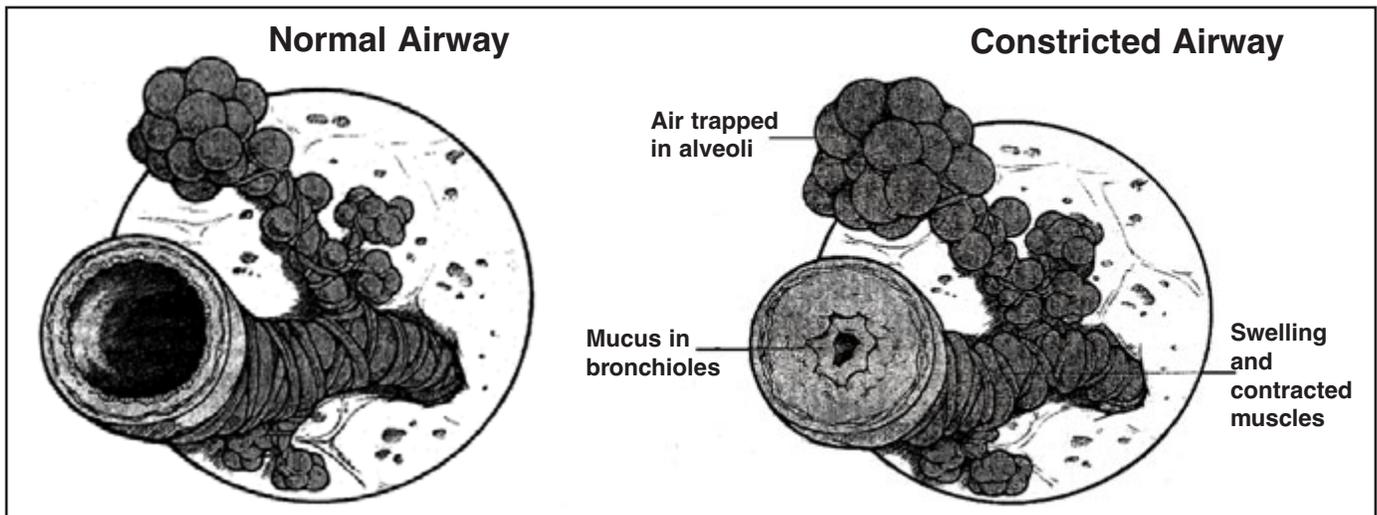
- Rapid, noisy breathing
- Chest congestion, tightness
- Wheezing during a respiratory illness
- Coughing after running or crying, especially at night
- Sucked-in looking chest (between ribs and at front of neck)
- Frequent respiratory infections such as pneumonia and bronchitis
- Shortness of breath

Maintaining control of asthma means recognizing asthma triggers (the factors that make asthma worse or cause an asthma episode), avoiding or controlling these triggers, following an asthma management plan and having convenient access to asthma medications. It also means modifying physical activities to match the individual’s current asthma status.

Each person with asthma has a list of triggers that can make his or her condition worse – that is, increase airway inflammation and/or make the airways constrict, which makes breathing difficult.

Some common triggers include:

- Exercise – running or playing hard, especially in cold weather
- Upper respiratory infections – colds or flu
- Laughing or crying hard
- Allergens
  - Pollen from trees, plants and grasses, including freshly cut grass
  - Animal dander from pets with fur or feathers
  - Dust and dust mites in carpeting, pillows and upholstery



- Cockroach droppings
- Molds
- Irritants
  - Cold air
  - Strong smells and chemical sprays, including perfumes, paint and cleaning solutions, chalk dust, lawn and turf treatments
  - Weather changes
  - Cigarette and other tobacco smoke

Some asthma triggers, like pets with fur or feathers, can be avoided. Others, like physical exercise, are important for good health and should be controlled rather than avoided.

## Controlling Asthma at School

Recognizing asthma symptoms and taking appropriate action in response to symptoms is crucial to asthma treatment and control. Acute symptoms require prompt action to help children resume their activities as soon as possible. Prompt action is also required to prevent an episode from becoming more serious or even life threatening. Acute symptoms requiring prompt action include:

- Coughing or wheezing
- Difficulty breathing
- Chest tightness or pressure reported by the child
- Other signs, such as low peak flow readings as indicated on the asthma management plan

A child's asthma management plan is developed by the child, parent/guardian and health care provider. Depending on the child's needs, the plan may be a brief information card or a more extensive individualized plan. Asthma management plans normally contain:

- Brief history of the child's asthma
- Asthma symptoms
- Information on how to contact the child's health care provider or parent/guardian
- Physician's/guardian's signature
- List of factors that make child's asthma worse
- The child's personal best peak flow reading if the student uses peak flow monitoring
- List of the child's asthma medications
- A description of the child's treatment plan, based on symptoms or peak flow readings, including recommended actions for school personnel to help handle asthma episodes

The student's asthma plan and the school's emergency plan should be easily accessible so that all staff, substitutes, volunteers and aides know what to do. Children often need immediate access to medication. There should be a clear understanding of the physician's instructions and the school's emergency plan before an attack occurs so the administration of appropriate medication is not delayed.

When a child suffers an asthma attack:

- Stop the child's current activity
- Follow the child's asthma management/action plan
- Help the child use his or her inhaled medication
- Observe for effect

Get emergency help if the child fails to improve or if any of the symptoms listed on the child's asthma plan as emergency indicators are present.

If any of the following symptoms are present, **consider calling 911:**

- The child is hunched over with shoulders lifted and straining to breathe
- The child has difficulty completing a sentence without pausing for breath
- The child's lips or fingernails turn blue

Each child has his or her personal best peak flow reading. This number should be noted in the child's asthma plan or health file. A peak flow reading less than 80 percent of the child's personal best indicates the need for action. A child should avoid running and playing until the peak flow reading returns or exceeds 80 percent of the personal best. A peak flow reading is only one indicator of asthma problems. Symptoms such as coughing, wheezing and chest tightening are also indicators of worsening asthma.

It is important that children take medications correctly. Many asthma medications are delivered by metered dose inhalers, which are highly effective but can be difficult to use.

## How to Use Your Peak Flow Meter

A peak flow meter is a small device that measures how well air moves out of the airways. Peak flow meters are most helpful for people with moderate or severe asthma.

### Starting Out: Find Your Personal Best Peak Flow Number

To find your best personal peak flow number, take your peak flow each day for two to three weeks. Your asthma should be under control during this time.

Take your peak flows as close to the times listed below as you can. These times for taking your peak flow are **only** for finding your personal best peak flow.

- Between noon and 2 p.m. each day
- Each time you take your quick-relief medicine to relieve symptoms (measure peak flow after you take your medicine)
- Any other time your doctor suggests

Write down the number you get for each peak flow reading. The highest peak flow number you had during the two to three weeks is your personal best.

Your personal best can change over time. Ask your doctor when to check for a new personal best.

## Your Peak Flow Zones

Your peak flow zones are based on your personal best peak flow number. The zones will help you check your asthma and take the right actions to keep it controlled. The colors used with each zone come from the traffic light.



**Red Zone** (below 50 percent of your personal best) signals medical alert. Add or increase quick-relief medicines and call your doctor **now**.



**Yellow Zone** (50 to 79 percent of your personal best) signals caution; your asthma is getting worse. Add quick-relief medicines. You might need to increase other asthma medicines as directed by your doctor.



**Green Zone** (80 to 100 percent of your personal best) signals good control. Take your usual daily, long-term control medicines, if you take any. Keep taking these medicines even when you are in the yellow or red zones.

Ask your doctor to write an action plan that tells you the peak flow numbers for **your** green, yellow and red zones and the medicines you should take while in each peak flow zone. Mark the zones on your peak flow meter with colored tape or a marker.

## How to Take Your Peak Flow

1. Move the marker to the bottom of the numbered scale.
2. Stand up or sit up straight.
3. Take a deep breath. Fill your lungs all the way.
4. Hold your breath while you place the mouthpiece in your mouth between your teeth.

5. Blow out as hard and as fast as you can. Your peak flow meter will measure how fast you can blow out air.
6. Write down the number you get. If you cough or make a mistake, do not write down the number. Do it again.
7. Repeat steps 1 through 6 two more times. Write down the highest of the three numbers. This is your peak flow number.
8. Check to see which peak flow **zone** your peak flow number is in. Do the actions your doctor told you to do while in that zone.

Your doctor may ask you to write down your peak flow numbers each day. You can do this on a calendar or other paper. This will help you and your doctor see how your asthma is doing over time.

## Checking Your Asthma: When to Use Your Peak Flow Meter

- Every morning when you wake **before** taking medicine – Make this part of your daily routine.
- When having asthma symptoms or an attack and after taking medicine for the attack – This can tell you how bad your asthma attack is and whether your medicine is working.
- Any other time your doctor suggests.

If you use more than one peak flow meter (such as at home and at school), be sure both meters are the same brand.

Bring your peak flow meter and your peak flow numbers to each of your doctor visits if you have written them down each day. Ask your doctor or nurse to check how you use the peak flow meter – just to be sure you are doing it right.

## How to Use Your Metered-Dose Inhaler the Right Way

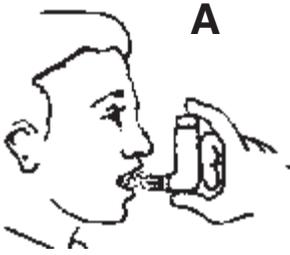
Using an inhaler seems simple, but most patients do not use it the right way. When used the wrong way, less medicine gets to your lungs. (Your doctor may give you other types of inhalers.)

Use your inhaler in one of the three ways pictured on page 5 (A or B is best, but C can be used if you have trouble with A and B).

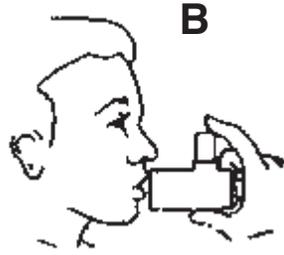
## Steps for Using Your Inhaler

### Getting ready

1. Take off the cap and shake the inhaler.
2. Breathe out all the way.
3. Hold your inhaler the way your doctor said (A, B or C on page 5).



**Hold inhaler 1 to 2 inches in front of your mouth (about the width of two fingers).**



**Use a spacer/holding chamber. These come in many shapes and can be useful to any patient.**



**Put the inhaler in your mouth. Do not use for steroids.**

### Breathe in slowly

- As you start breathing in **slowly** through your mouth, press down on the inhaler one time. (If you use a holding chamber, first press down on the inhaler. Within 5 seconds, begin to breathe in slowly.)
- Keep breathing in **slowly** as deep as you can.

### Hold your breath

- Hold your breath as you count to 10 slowly, if you can.
- For inhaled quick-relief medicine (beta<sub>2</sub>-agonists), wait about 1 minute between puffs. There is no need to wait between puffs for other medicines.

Clean your inhaler as needed. Look at where the medicine sprays out of the inhaler. If you see “powder” in or around the hole, clean the inhaler. Remove the metal canister from the L-shaped plastic mouthpiece. Rinse the mouthpiece and cap in warm water. Let them dry overnight. In the morning, put the canister back inside. Put the cap on.

(From *Facts About Controlling Asthma*, National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, NIH Publication No. 97-2339.)

## Living With Asthma

Asthma attacks can strike without warning and last from minutes to days. Approximately 70 percent of adults with asthma exhibit allergic responses. Avoidance or control of triggers that lead to asthma attacks is as much a priority as treatment of the disease. Because there are so many substances that can trigger allergic responses, identifying and avoiding the allergens can be very difficult.

Some simple actions can be taken to avoid the most obvious and common problems. The NHLBI suggests the following:

### Tobacco Smoke

- If you smoke, ask your doctor for ways to help you quit. Ask family members to quit smoking too.
- Do not allow smoking in your home or around you.
- Be sure no one smokes at your child’s day care center or school.

### Dust Mites

Many people with asthma are allergic to dust mites. Dust mites are tiny “bugs” you cannot see that live in cloth or carpet.

Things that will help the most:

- Encase your mattress in a special dust-proof cover.
- Encase your pillow in a special dust-proof cover or wash the pillow each week in hot water. Water must be hotter than 130 degrees F to kill the mites.
- Wash the sheets and blankets on your bed each week in hot water.

Other things that can help:

- Reduce indoor humidity to less than 50 percent. Dehumidifiers or central air conditioners can do this.
- Try not to sleep or lay on cloth-covered cushions or furniture.
- Remove carpets from your bedroom and those laid on concrete, if you can.
- Keep stuffed toys out of the bed, or wash the toys weekly in hot water.

## Animal Dander

Some people are allergic to the flakes of skin or dried saliva from animals with fur or feathers. The best thing to do:

- Keep furred or feathered pets out of your home.
- If you cannot keep the pet outdoors, then keep the pet out of the bedroom and keep the bedroom door closed.
- Cover air vents in your bedroom with material to filter the air.
- Remove carpets and furniture covered with cloth from your home. If that is not possible, keep pets out of the rooms where you are.

## Cockroaches

Many people with asthma are allergic to the dried droppings and remains of cockroaches.

- Keep all food out of your bedroom.
- Keep food and garbage in closed containers (never leave food out).
- Use poison baits, powders, gels or paste (boric acid, for example). You can also use traps.
- If a spray is used to kill roaches, stay out of the room until the odor goes away.

## Vacuum Cleaning

Try to get someone else to vacuum for you once or twice a week. Stay out of the rooms while they are being vacuumed and for a short while afterward. If you vacuum, use a dust mask, a double-layered or microfilter vacuum cleaner bag or a vacuum cleaner with a HEPA filter.

## Indoor Mold

- Fix leaky faucets, pipes or other sources of water.
- Clean moldy surfaces with a cleaner that has bleach in it.

## Pollen and Outdoor Mold

What to do during your allergy season (when pollen or mold spore counts are high):

- Try to keep windows closed.
- Stay indoors with windows closed during midday and afternoon. Pollen and some mold spore counts are highest at that time.

Credit is given to Dr. W. Russ Kennedy, former Extension health and aging specialist, University of Arkansas Cooperative Extension Service, as the original author of FSHEL16, *Asthma*.

- Ask your doctor whether you need to take or increase anti-inflammatory medicine before your allergy season starts.

## Smoke, Strong Odors and Sprays

- If possible, do not use a wood-burning stove, kerosene heater or fireplace.
- Try to stay away from strong odors and sprays such as perfume, talcum powder, hair spray and paints.

## Exercise, Sports, Work or Play

You should be able to be active without symptoms. See your doctor if you have asthma symptoms when you are active – when you exercise, do sports or play or work hard. Ask your doctor about taking medicine before exercise to prevent symptoms.

- Warm up for about 6 to 10 minutes before you exercise.
- Try not to work or play outside when the air pollution levels are high.

## Other Things That Can Make Asthma Worse

- **Flu** – Get a flu shot.
- **Sulfites in foods** – Do not drink beer or wine or eat shrimp, dried fruit or processed potatoes if they cause asthma symptoms.
- **Cold air** – Cover your nose and mouth with a scarf on cold or windy days.
- **Other medicines** – Tell your doctor about all the medicines you take. Include cold medicines, aspirin and even eye drops.

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