

Asthma Basics

What is asthma?

Asthma is a chronic lung condition with ongoing inflammation of the airways, or “bronchial tubes.” Asthma causes episodes of breathing problems such as—

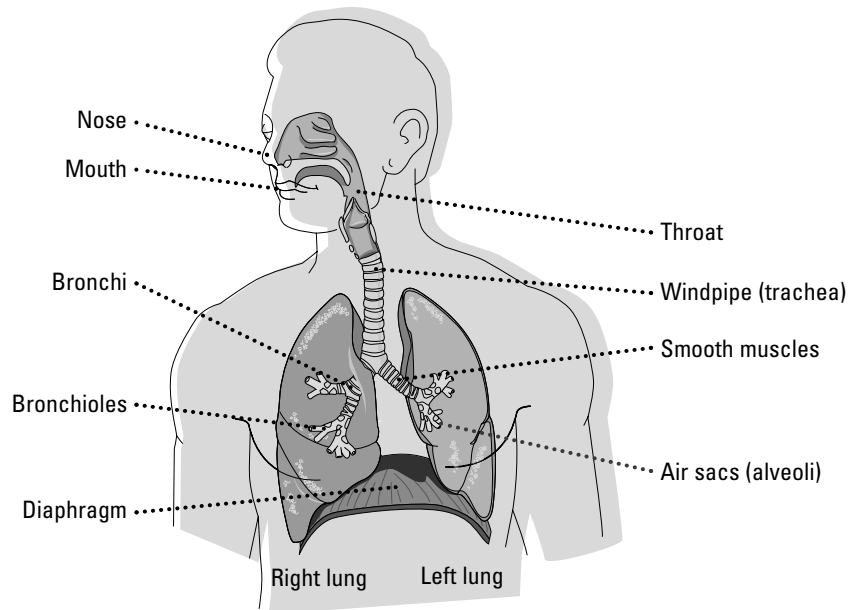
- ★ *coughing*
- ★ *wheezing*
- ★ *chest tightness*
- ★ *shortness of breath*

Inflammation causes the lining of the airways to swell and produce more mucus. When this happens, the airways narrow and obstruct the flow of air out of the lungs. Several different factors called asthma triggers can worsen inflammation.

Why you need to know about asthma

In the United States, asthma is the most common chronic childhood illness. Asthma affects an estimated 5 million children nationally. Asthma is among the leading causes of school absenteeism, accounting for more than 10 million lost school days annually. Asthma can be disruptive not only to the students with breathing problems, but to others around them. School personnel need to understand asthma, its causes, and its treatment.

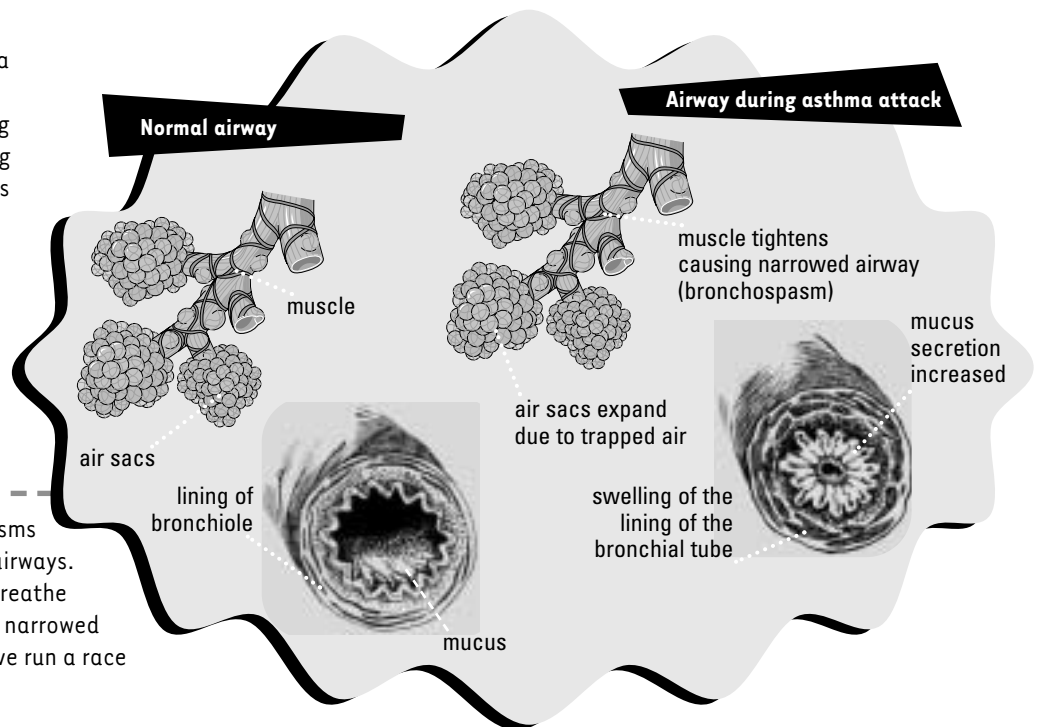
Together, inflammation and bronchospasms make it harder to move air through the airways. Students with asthma work harder and breathe faster to move enough air through these narrowed airways. They often appear as if they have run a race when they are sitting quietly.



What happens during an “asthma episode?”

An acute episode of asthma, or “asthma attack,” occurs when there is a narrowing of the airways caused by the following:

- ★ **Swelling**—the lining of the airway swells, making the airway smaller. This swelling is caused by inflammation of the airways.
- ★ **Mucus**—the tissues that line the airway secrete extra mucus. This mucus can further plug the narrowed airways.
- ★ **Bronchospasm**—the muscles that surround the airway tighten and make the airway even smaller.



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What are “early warning signs?”

Most people think that an asthma episode starts suddenly. However, many students show “early warning signs” before the episode begins. These signs may include:

fatigue
headache
watery eyes
hyperactivity
behavioral changes
itchy throat or chin
stuffy or runny nose
funny feeling in chest
dark circles under eyes
feeling nervous or anxious

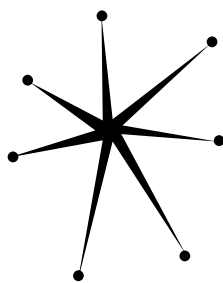
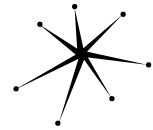
Obvious signs and symptoms of asthma, such as coughing, wheezing, and the feeling of not being able to get enough air, may follow.

Pay attention to each student’s early warning signs and asthma symptoms. If they occur, take action!

What are asthma triggers?

There are numerous triggers that can cause an asthma episode or worsen asthma. The most common triggers include:

- ★ **Exercise**—also called “Exercise-Induced Asthma” or EIA
- ★ **Colds**—caused by viral illnesses
- ★ **Allergies**—pollens from trees, grasses and weeds, dander from furry animals, dust and dust mites, and molds
- ★ **Weather**—cold air or sudden or marked changes in temperature, humidity, or barometric pressure
- ★ **Irritants**—cigarette smoke, air pollution, chalk dust, dust, and strong odors (paint, markers, perfumes, sprays, etc.)
- ★ **Emotions**—excitement, anxiety, tension, depression, etc.



Secondhand Smoke

Secondhand smoke is the smoke from the burning end of a cigarette, cigar, or pipe, and the smoke breathed out by smokers. Secondhand smoke has many harmful chemicals and is especially harmful to children and individuals with lung disease.

Studies have shown that children who breathe secondhand smoke are more likely to suffer from:

- ★ Pneumonia, bronchitis, and other lung infections resulting in repeated hospitalizations.
- ★ Frequent ear infections.
- ★ Asthma and an increase in asthma episodes.

It has been shown that when the parents of a child with asthma stop smoking, the child’s asthma often improves.

Suggestions for protecting children from secondhand smoke include:

- ★ Encourage parents and other caretakers to quit smoking.
- ★ If adults in the household must smoke, encourage them to smoke outdoors and not in the house or car.
- ★ In restaurants, ask to sit in the non-smoking area and encourage the restaurant to go “smoke-free.”
- ★ Make sure that children’s day-care, school and after-school programs are smoke free.



Medications

Asthma medications belong to two broad categories based on whether they provide *quick relief* or *long-term control* of asthma symptoms. Generally, both categories have medications that

- 1) Open the airways by relaxing the muscles around the bronchial tubes (called bronchodilators)
- or**
- 2) Reduce the inflammation of the airways (called anti-inflammatory drugs).

Category	Asthma Medications
<p>Quick relief of symptoms <i>Used to provide prompt relief of asthma symptoms.</i></p> <hr/> <p>Bronchodilators</p> <ul style="list-style-type: none"> * Short-acting medications that act quickly. * Improvement is usually seen within 5-10 minutes. * Given by metered-dose or dry-powder inhaler, nebulizer, syrup, or tablet. * Commonly used in the school setting for quick relief of symptoms. 	<hr/> <p>Short-acting</p> <ul style="list-style-type: none"> * albuterol (Ventolin[®]₁, Proventil[®]₂) * Maxair[®]₃ * Xopenex[™]₄
<p>Long-term control of asthma symptoms <i>Taken as part of daily treatment to control asthma.</i></p> <hr/> <p>Long acting bronchodilators</p> <hr/> <p>Anti-inflammatory drugs</p>	<p>Nonsteroidal agents</p> <ul style="list-style-type: none"> * Accolate[®]₆ * Intal[®]₉ * Tilade[®]₁₃ * Singulair[®]₇ <hr/> <p>Combination medications</p> <ul style="list-style-type: none"> * Advair[®]₁ (combination of Serevent and Flovent) <hr/> <p>Long acting</p> <ul style="list-style-type: none"> * Foradil[®]₅ * Serevent[®]₁ <hr/> <p>Inhaled steroids</p> <ul style="list-style-type: none"> * AeroBID[®]₈ * Azmacort[®]₉ * Beclovent[®]₁ * Flovent[®]₁ * Pulmicort Respules[®]₆ * Pulmicort Turbuhaler[®]₆ * QVAR[™]₃
<p>Acute moderate-severe asthma episodes <i>May be needed for severe exacerbation.</i></p> <hr/> <p>Oral "systemic" steroids</p>	<hr/> <p>Oral steroids</p> <ul style="list-style-type: none"> * Medrol[®]₁₄ * Pediapred[®]₁₀ * Prednisone[®]₁₁ * Prelone[®]₁₂

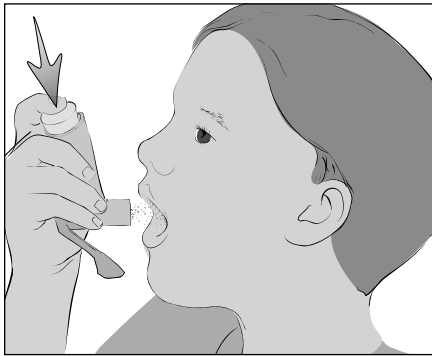
1 GlaxoSmithKline
2 Schering Corporation
3 3M Pharmaceuticals
4 Sepracor
5 Novartis
6 AstraZeneca Pharmaceuticals, LP
7 Merck & Co., Inc.
8 Forest Pharmaceuticals, Inc.
9 Aventis Pharmaceuticals
10 Medeva Pharmaceuticals, Inc.
11 Roxane Laboratories, Inc.
12 Muro Pharmaceuticals, Inc.
13 Rhone-Poulenc Rorer Pharmaceuticals, Inc.
14 Pharmacia & Upjohn



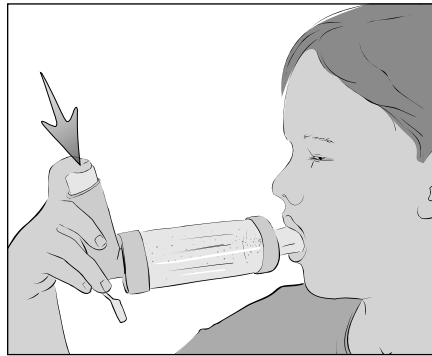
Correct use of Metered-Dose Inhaler (MDI)

Steps for using an inhaler

1. Remove the cap and hold the inhaler upright.
2. Shake the inhaler.
3. Tilt the head back slightly and breathe out.
4. Position the inhaler in one of the following ways—



Place inhaler 1" to 2" away from open mouth.



Use a spacer with the inhaler. Spacers are useful for all patients, particularly young children and older adults, for use with inhaled steroids and during an asthma episode.

5. Press down once on inhaler to release medication while inhaling slowly.
6. Breathe in slowly (3-5 seconds).
7. Hold breath for 10 seconds to allow medicine to reach deeply into lungs and then exhale slowly.
8. Repeat puffs as directed by your physician. Wait 1 full minute before repeating the next puff of your bronchodilator inhaler.
9. If using inhaled steroids, rinse mouth with water after use.

Spacers—

- ★ Easy to hold inhaler in right position.
- ★ Holds the puff of medicine, so it can be inhaled more slowly.
- ★ Helps more medicine get to the airways.

Information above adapted from "Guidelines for the Diagnosis and Management of Asthma."
U.S. Department of Health and Human Services (Pub. No. 91-3042).

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What is a Peak Flow Meter?

The Peak Flow Meter measures how fast the student can blow air out through the airways. It lets the student and supervising adult know how much airway narrowing is present at a given time. There are many different types of Peak Flow Meters, but they all perform the same function.



How can a Peak Flow Meter help?

- ★ It can tell how much airway narrowing is present.
- ★ It can give an early warning of an asthma episode, sometimes before other symptoms develop.
- ★ It can signal when medication can prevent asthma from getting worse.
- ★ It can measure how well the student's asthma medications are working.
- ★ It can help identify asthma as the cause of shortness of breath, chest tightness, coughing, or fatigue during physical activities (P.E., recess, sports).
- ★ It can help adults share information about the student's asthma.

Which student should have a Peak Flow Meter at school?

- ★ If the student requires asthma medications at school, it is also helpful to have a Peak Flow Meter available.
- ★ The student who has asthma symptoms at school.

The school nurse should talk with the student's family and physician about having a Peak Flow Meter at home and another at school.

How is a Peak Flow Meter used?

Give the student the following instructions

- ★ Stand up straight and make sure the pointer is at "zero" on the meter. Clean out your mouth (gum, food, etc.).
- ★ Take a deep breath. Put the mouthpiece past your teeth and close lips around it. Make sure your tongue doesn't touch the mouthpiece.
- ★ Blow out as **hard and fast** as you can. A fast blast, not a slow blow.
- ★ Check to see how high the pointer went. This measurement value is the "peak flow."
- ★ Repeat two more times and write down the highest peak flow of the three blows. Most school-aged children can use a Peak Flow Meter correctly with practice.

When is the Peak Flow Meter used?

- ★ Before P.E. or physical activities (e.g., "field day").
- ★ On or before field trips.
- ★ During asthma episodes, a peak flow measure will help to guide asthma care (see the *Daily Asthma Management Plan*).
- ★ Whenever there is any question about chest symptoms or asthma control.

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What do Peak Flow Meter readings mean?

The peak flow reading should be compared to the student's "Personal Best" peak flow value. The student can blow his/her "Personal Best" when asthma is well-controlled. The student's physician should determine the student's "Personal Best" peak flow value. This "Personal Best" value should be clearly recorded in the student's health file and used to make asthma management decisions (see the *Daily Asthma Management Plan*).

It is helpful to think about Peak Flow Zones

Green Zone

- * 80-100% of the student's "Personal Best"
- * Asthma is under good control.

Yellow Zone

- * 50-80% of the student's "Personal Best"
- * **Caution**—Asthma is not under good control. Additional steps need to be taken.

Red Zone

- * **Less than 50%** of the student's "Personal Best"
- * **Danger**—immediate action is needed.
- * Give treatment as directed by the student's physician (see *Daily Asthma Management Plan*).
- * If the response is poor, call **911** or emergency medical services in your area. The student should be taken immediately to the emergency room.
- * Call the student's parent/guardian.



How to help the student's physician set Peak Flow Zones (for School Nurses)

- * Have the student see the school nurse two times per day, if possible. If only one time is possible, morning is preferable. This meeting can be around medication time, but not after exercise.
- * Have the student blow a peak flow three times and record the best number. The student must blow as hard and fast as possible.
- * If the student takes an inhaled bronchodilator, repeat the peak flow about 5–10 minutes after the medication. Record this value, also.
- * Repeat this process for 2 consecutive weeks. The student's asthma needs to be stable and well controlled during this time.
- * You should now have a narrow range of peak flow values. This information should be shared with the student's physician for setting the student's "Personal Best" value and Green-Yellow-Red Zones. These values will allow you to better assess the student.
- * Peak flow values are affected by age, height, race, and gender. Keep in mind that when the student is growing, their "Personal Best" is also likely to increase.