



Asthma

What is asthma?

Asthma is a chronic disorder of the airways of the lungs. The airways are reactive and may be inflamed even when symptoms are not present. The extent and severity of airway irritation and consequent symptoms changes over time. The most important goal of asthma management is to control the inflammation in the airways and minimize resultant symptoms.

In an asthma “attack,” the airways can spasm and become narrower. The inner lining of the airways becomes swollen, and the outer muscular lining of the airways constrict, making breathing labored. The good news is that asthma can be treated and controlled.

Who gets asthma?

Asthma is the most common serious chronic illness of children. It is a frequent reason why kids miss school and the most common reason for hospitalization in children. In the U.S., almost 1 out of 10 children has asthma.

Many things can influence when asthma occurs. These include: family history (other family members with allergies, asthma, or eczema), infections, exposure to different allergens, tobacco exposure, and exposure to pollution. Children with other types of allergic diseases (food allergy, allergic rhinitis, or eczema) have a higher likelihood of developing asthma.

The prevalence of asthma has been increasing worldwide, but why this is happening is not known.

What are symptoms of asthma?

Some symptoms can appear quickly and others develop over time. Some kids have such frequent or severe symptoms of asthma that they require daily medication. Other children might just need asthma medications intermittently.

A cough may be the first and sometimes is the only asthma symptom. Other symptoms can include:

- ◆ Wheezing (a high-pitched musical sound)
- ◆ Difficulty breathing or feeling short of breath
- ◆ Chest tightness
- ◆ Reduced exercise tolerance

How is asthma diagnosed?

There is no simple test to diagnose asthma in children. It is often difficult to diagnose in young children. Your child’s physician will ask you specific questions about your child’s

history and will then do a thorough physical exam. What you tell the doctor can help determine if your child has asthma. Pertinent questions include:

- Does your child have any symptoms such as wheezing, cough, or feeling short of breath?
- How often do these symptoms occur and how serious are the symptoms? Do they cause your child to miss school or have to sit out from sports? Does coughing keep your child up at night?
- What seems to trigger the symptoms or worsen them? (Common triggers are infections, exercise, smoke, allergens, or stress)
- Is there a history of chronic or frequent runny nose or skin rashes?
- Have any medicines been tried? If so, has anything helped?
- Is there a family history of asthma or allergies?

If your child sees a lung specialist and is over 5 or 6 years old, he or she may test your child's lung function with a special machine called a spirometer. The spirometer measures the amount of air the child can exhale and how quickly. It is often helpful to do these measurements before and after medication is used to treat asthma to assess the response.

If your child's symptoms do not resolve with medications, tests may need to be done to check for other conditions that can make asthma worse or that can masquerade as asthma. Some conditions that can do this are gastroesophageal reflux, vocal cord dysfunction, sinusitis, and even allergic rhinitis.

Asthma can sometimes be tricky to diagnose, and sometimes lung function testing can be normal even in children with asthma. For some children, the tendency to wheeze with colds or other triggers goes away as they grow older.

How is asthma treated?

The goal of asthma therapy is to decrease or completely eradicate symptoms so that children can fully take part in normal physical activities. We can achieve this by avoiding known asthma triggers (such as cigarette smoke) and using asthma medication when needed. It is also a priority to eliminate as much as possible the need for ER visits and hospitalizations due to asthma. If your child is having symptoms of asthma more than twice per week, please make your child's doctor aware of this. This suggests suboptimal control.

What are triggers of asthma?

Certain things that cause asthma or make it worse are called triggers. It is important to try to discover what those triggers are for your child and to avoid them as much as possible. Allergens and irritants are triggers that are commonly found in home, school, child care, and relatives' homes. Some frequent triggers are:

• *Allergens*: Things to which your child might be allergic and which may be a prominent cause of asthma symptoms:

- Dust mites
- Animals with fur or hair
- Cockroaches
- Mice
- Pollens (grasses, weeds, and trees)

• *Infections*: Viruses such as the common cold or bacterial infection such as pneumonia or sinusitis

•*Environmental irritants:*

- Cigarette or other smoke
 - Air pollution
 - Cold or dry air
 - Sudden weather or temperature changes
 - Odors, fragrances, chemicals in sprays
 - Unventilated space heaters (kerosene or gas) and fireplaces
 - Odors and gases released from new carpets, furniture, or other materials in new homes or buildings
- Exercise:* The vast majority of people with asthma can develop wheeze, cough, or shortness of breath when they exercise.
- Emotional stress:* crying or laughing hard

How can your child avoid triggers?

It may be impossible to completely rid your home of all allergens or irritants, but there are reasonable things that you can do to reduce your child's exposure to triggers.

Avoidance of triggers can help you reduce your child's need for asthma medication.

- ◆ *Don't smoke*-don't let your child be exposed to smoke in your home or car
- ◆ *Dust mite exposure*-If your child is allergic to dust mites, then covering your child's mattress and pillows with dust mite-proof covers and washing bedding weekly can significantly reduce exposure. Vacuuming and dusting often is also recommended. Removing carpeting and stuffed animals from the bedroom can also help reduce exposure.
- ◆ *Reduce exposure to pet allergens:* If your child is allergic to certain pets, they should be removed from the home if at all possible. The next best possibility would be to keep the pet out of your child's bedroom and keep the door closed. A high-efficiency particulate air filter (HEPA) in the bedroom or on the furnace might also help reduce pet allergen levels. Neither of these are as effective as removing the pet from the home.
- ◆ *Control cockroaches*
- ◆ *Control mice*
- ◆ *Prevent mold:* Mold is generally due to excessive moisture indoors, which can result from water damage by flooding, leaky roofs, leaky pipes, or excessive humidity. Repair any source of water leakage. Indoor humidity can be reduced with exhaust fans or a dehumidifier. Existing mold must be cleaned with detergent and water, but if the mold has invaded into the wallboard, some areas may need to be replaced to completely control asthma symptoms from mold.
- ◆ *Reduce pollen exposure if your child is allergic:* Avoiding open windows during high pollen season and using the air conditioner instead can help.
- ◆ *Reduce indoor irritants:* Use unscented cleaning products and avoid mothballs, room deodorizers, and scented candles.
- ◆ *Check air quality reports:* When the air quality is very poor, it is best to keep your asthmatic child indoors as much as possible.

What types of medicines are used?

Asthma can have varied manifestations and differ in each child. Your child's doctor will decide which asthma medicine is best for your child based on the severity and frequency of symptoms.

Children with only intermittent symptoms can take medicines on an as-needed basis, usually only for short periods. Children with more frequent symptoms may need a daily controller medication. Sometimes more than one medicine is necessary to control and prevent symptoms. If your child has been severely affected, your child's doctor may

prescribe a few medications at first to quickly gain control and make your child feel better and then try to decrease the medications as your child improves. Your child's doctor will probably provide you with an *asthma action plan* to have at home so that you know exactly what to do on a daily basis and what to do when certain symptoms begin.

Forms of asthma medicine

Asthma medications come in several different forms, including:

- Metered dose inhalers (MDIs)
- Dry powder inhalers (DPIs)
- Liquids used in a machine called a nebulizer
- Pills, chewable, or granule medications

Generally inhaled forms are preferred because they deliver the medicine directly to the lungs with minimal side effects.

Types of asthma medications

- *Rescue medications*: These are medicines that quickly relieve symptoms of wheezing, shortness of breath, and chest tightness. These medicines are usually taken on an as needed basis. With children who have exercise-induced asthma, they can also prevent symptoms if taken before exercise. Albuterol is the most commonly used rescue medication and works by relaxing the smooth muscle of the airways.
- *Controller medications*: These are usually used daily to control asthma and prevent frequent symptoms. They work by decreasing swelling of the airway and some work by causing long acting relaxation of the airway muscles. Controllers do not help in the acute setting and do not provide any immediate relief. They help over days to weeks to reduce inflammation and usually have maximal efficacy after 2-4 weeks of daily use. Generally, if your child has symptoms more than twice per week during the day or persistent night time cough more than twice per month, a daily controller is indicated.

Controllers medicines include:

--inhaled steroids-these are the most effective and for that reason the preferred choice. They are very safe and do not cause the serious long term side effects often seen with frequent use of oral steroids.

--Long acting bronchodilators-these are used in inhalers that also have an inhaled steroid.

--Leukotriene receptor antagonists-they are oral medications that block part of the inflammation cascade and can have benefits against both asthma and allergies.

Your doctor will talk with you about which agent he or she thinks would work best for your child if one of these is needed.

What devices are used to deliver asthma medicines?

Medicines for asthma can be given to your child using different devices. These include:

◆ **Nebulizer**: This uses an air compressor and cup to vaporize the liquid medication into a mist your child can breathe in. In order for optimal delivery of the medicine to the lungs, these medications must be given with a mask (for babies and small children) or a mouthpiece (for older children to adults).

◆ **Metered dose inhaler**: This is the most frequently used device for asthma medications. Spacers or aerochambers, which attach to the inhaler significantly improve the delivery of the medication to the lung and decrease oral absorption. This enhances the efficacy and decreases side effects. There is one new controller inhaler on the market now that has its own chamber, Aerospin, which is licensed for children 6 and up.

◆ **Dry powder inhaler:** This device is available for some medicines. It does not require coordination of breathing in with pressing a button, but it does require training and is not generally used in children less than 4.

Peak flow meter

A peak flow meter can be used with children over 6 to have a baseline level of how fast air can be blown out. Your child's doctor may recommend one for asthma monitoring.

Asthma and School

Since children spend most of their waking hours at school, it is very important that asthma symptoms can be managed there. It is a good idea to let the school know that your child has asthma and have medications for use if your child develops any persistent cough or shortness of breath.

1. Communication with the school is vital to proper asthma management for your child.

- Think about meeting with your child's teachers, the school nurse, and coaches at the beginning of the school year to let them know about your child's asthma, how serious it is, and what medicines your child takes, as well as what to do in the event of an emergency.
- Ask your child's doctor to fill out an asthma action plan for the school as well as a permission form that includes whether your child can be allowed to carry and use his own inhaler and spacer.
- Sign a release at school and your child's doctor's office to allow exchange of medical information between you, the school, and your child's doctor.
- Ask the school nurse about its policies on how your child will have access to his medicines and how they deal with emergencies during field trips and after school activities.
- Ask for updates as necessary. The school should also let you know about changes or problems with your child's symptoms while he is at school.

2. Help your child manage his asthma at school.

Talk with your child about how well his asthma is being handled at school. Also talk with your child's teachers, school nurse, coaches, or other school personnel about how well your child is coping with asthma at school.

Students with asthma face additional hurdles at school, which can include:

- Missing school because of asthma symptoms or doctor visits
- Avoiding school or school activities. If your child's asthma is under suboptimal control, he might avoid exercise, as that can be a trigger. Exercise is one trigger we do **not** want your child to avoid long term, but sometimes better medication management is needed to allow your child to consistently exercise without triggering asthma symptoms.
- Your child might be struggling because he is not taking his medicine before exercise as instructed. She might not want to go to the nurse or office to use her inhaler before exercise, but then she might feel bad and avoid exercise if she does not use it. If your child is old enough and responsible to use his inhaler properly independently, most schools will authorize her to carry the inhaler with her to avoid this problem.

Summary

Asthma is a chronic disease of inflammation and constriction of the airways. Depending on the frequency and severity of your child's symptoms, your child's doctor will prescribe medications to minimize symptoms and maximize your child's ability to participate fully in life. Besides medication, avoiding those triggers that are avoidable (such as cigarette smoke) can help reduce the need for medication. Your child's doctor might also recommend allergy testing to see if allergy plays a significant role in your child's asthma.

While there is no one perfect medicine that controls all asthma, most children's asthma can be well controlled to minimize symptoms and maximize your child's ability to take part in things he enjoys. We also want to make sure your child's symptoms are well controlled at school and that he has any needed rescue medications at school.

If you have questions about your child's asthma, please call your child's doctor or set up an appointment so that he or she can examine your child and answer your questions fully for you.