

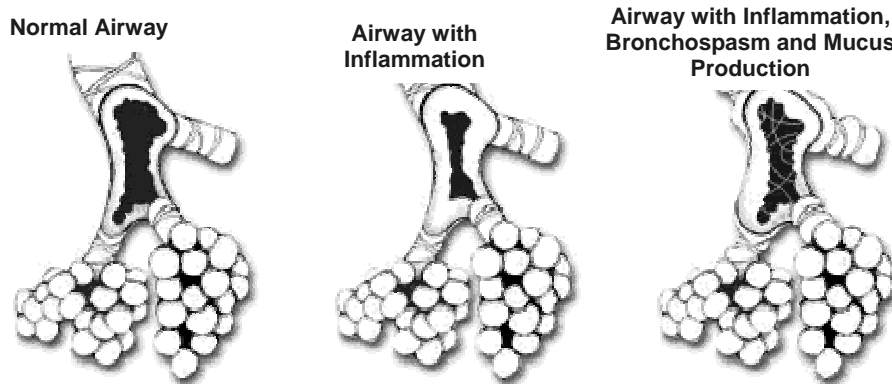
The Texas Asthma Camp for Kids

What is Asthma?

Asthma is a chronic respiratory disease—sometimes worrisome and inconvenient—but a manageable condition. With proper understanding, good medical care, and monitoring, asthma can be kept under control.

Those who have asthma are not alone. In the United States, asthma affects 14 to 15 million people. Today, 4.8 million children have asthma. Asthma, also known as reactive airway disease, is defined as a chronic lung condition with:

- Inflammation (swelling) of the airways.
- Increased sensitivity of the airways to a variety of things that make asthma worse.
- Obstruction of airflow.



Typical Changes in the Airway Include:

Inflammation - Recent research has shown that inflammation of the lining of the airways is the most common feature of asthma. When they are stimulated, certain cells lining the airways release chemical substances (mediators) that lead to inflammation. This causes the airway lining to swell and narrow. The inflammation may last for weeks following an episode. Most people with asthma have some degree of inflammation all of the time. Some long-term control medications can help prevent and reduce inflammation.

Increased Sensitivity - Another characteristic of asthma is increased sensitivity of the airways. When inflammation occurs in the airways, they become more sensitive. When the airways are more sensitive, asthmatics are more likely to have asthma symptoms when exposed to things that make asthma worse.

Airway Obstruction - In addition to inflammation, further airway obstruction sometimes occurs with asthma. Obstruction is caused by the tightening of muscles that surround the airways. This is also called bronchospasm. Bronchospasm causes further narrowing of the inflamed airways. Inhaled quick-relief medications are generally very effective in reversing bronchospasm.

In some people with asthma, the mucus glands in the airways produce excessive, thick mucus, further obstructing the airways.

Recognizing Asthma Signs and Symptoms

Recognizing the signs and symptoms of asthma is an important part of managing asthma. Knowing when early warning signs or mild symptoms are occurring is helpful so that treatment and other interventions can begin early. Early treatment is most effective. If severe symptoms are present, it is vital to begin the appropriate treatment immediately. Accurate and timely assessment of a child's symptoms can help to decide if treatment should begin in the home, at the clinician's office, or in the emergency room.

Early Warning Signs of Asthma

Early warning signs are experienced before the start of an asthma episode. By recognizing these clues that occur before actual asthma symptoms, early treatment can be started. These signs are unique to each person. Early warning signs may be the same, similar, or entirely different with each episode. Some early warning signs may be noticed only by the individual, while other early warning signs are more likely to be noticed by other persons. In addition, a downward trend in peak flow numbers can be a reliable early warning sign. Some examples of early warning signs are:

- Breathing changes
- Sneezing
- Moodiness
- Headache
- Runny/stuffy nose
- Coughing
- Chin or throat itches
- Feeling tired
- Dark circles under eyes
- Trouble sleeping
- Poor tolerance for exercise
- Downward trend in peak flow number

Asthma Symptoms

Asthma symptoms indicate that an asthma episode is occurring. Examples of asthma symptoms include:

- Wheezing
- Coughing
- Shortness of breath
- Tightness in the chest
- Peak flow numbers may be in the caution or danger range (usually 50% to 80% of personal best)

Changes have taken place in the airways and airflow is obstructed. Individuals with asthma experience some or all of these during an asthma episode. Action should be taken to treat these symptoms before they become worse.

Severe Asthma Symptoms

Severe asthma symptoms are a life-threatening emergency. These symptoms indicate respiratory distress. Examples of severe asthma symptoms include:

- Severe coughing, wheezing, shortness of breath or tightness in the chest
- Difficulty talking or concentrating
- Walking causes shortness of breath
- Breathing may be shallow and fast or slower than usual
- Hunched shoulders (posturing)
- Nasal flaring (Nostril size increases with breathing)
- Neck area and between or below the ribs moves inward with breathing (retractions)
- Gray or bluish tint to skin, beginning around the mouth (cyanosis)
- Peak flow numbers may be in the danger zone (usually below 50% of personal best)

If any of these severe asthma symptoms occur, seek emergency medical treatment right away.

What Causes Asthma?

Although the actual cause of asthma is not known, many studies have shown that several factors can lead to the development of asthma. These factors include a person's genetics, development and growth of the lungs and immune system, various infections, and exposures in the environment.

Is Asthma a Genetic Disease?

It is widely accepted that asthma is a disease that can be inherited. However, the gene or genes that are involved are not clearly identified. It is believed that the genes linked to asthma involve the lungs and the immune system. It is well known that the "Atopic Diseases," Atopic Dermatitis, Allergic Rhinitis and Asthma, are commonly found in one form or another within families.

Does Asthma Develop During Childhood?

The early months and years of a child's life are critical times during which a baby can develop or become susceptible to developing asthma. The abnormal development and growth of the lungs can increase a person's risk for developing asthma. Premature babies born with lungs not fully developed are more susceptible to colds and other respiratory infections. In some cases, an infection can cause inflammation and injure lung tissue. If the baby is exposed to secondhand smoke at this time, more damage to the lungs may occur and change how the lung functions.

What is the Immune System's Role in Asthma?

Many studies have shown that children and adults with asthma have an immune system that responds differently from those who do not have asthma. Many of these people with asthma are allergic and will react to things that do not cause problems in others. Their immune system overreacts when they come in contact with every day substances such as pollens,

mold, or cat dander. In some cases, the immune system may overreact to other substances, such as a virus or bacteria, and increase the risk of asthma.

Do Environmental Exposures Cause Asthma?

There are many non-allergic or non-immunologic exposures in the environment that can increase the chance of developing asthma. Exposure to irritants on a long-term basis, such as secondhand smoke in the home, is a major risk factor for developing asthma. Other exposures like this are indoor chemicals and air pollution.

More research is being done to better understand the role of genetics, infections, exposures and the immune system in the development of asthma and other allergic disorders. This information may help to prevent the development of these problems in the future.

Are There Different Types of Asthma?

Asthma is sometimes classified in various ways. Often, these "types of asthma" describe the **triggers** that may cause an asthma episode (or asthma attack) or the things that make asthma worse in certain individuals. Types of asthma include steroid-resistant, nocturnal, occupational, and exercise-induced.

Exercise-Induced Asthma - Exercise can make asthma symptoms worse. With treatment and monitoring, people with exercise-induced asthma can participate in physical activities.

Nocturnal Asthma - Worsening of asthma at night is very common. Treatment of underlying causes is important in managing nocturnal asthma.

Occupational Asthma - Workplace exposure to certain chemicals or dusts can induce asthma. Quick recognition and control of workplace exposures is important.

Steroid-Resistant Asthma (Severe Asthma) - While the majority of patients respond to regular inhaled glucocorticoid (steroid) therapy, some are steroid resistant.

Is Asthma Related to Other Conditions?

Asthma is often associated with other conditions. These conditions are often considered triggers, or things that make asthma worse. They may lead to an asthma attack, or episode, or a worsening of asthma symptoms. Each of the following conditions is often associated with asthma.

Allergies can make asthma worse, although not all people with asthma have allergies, and not all people with allergies have asthma.

Gastroesophageal Reflux Disease (GERD) - In some people, the muscle between the esophagus and stomach may allow some back flow of stomach acid into the esophagus. This may cause heartburn, as well as a reflex response that can result in asthma symptoms.

RSV - There is a hypothesis that respiratory syncytial virus (RSV) can contribute to the development of asthma. Read about a study done to support this hypothesis. Sinusitis, an inflammation of the mucous membranes that line the sinus cavities, can be related to asthma. **Sinusitis** - an inflammation of the mucous membranes that line the sinus cavities, can be related to asthma.

How is Asthma Diagnosed?

The first step in diagnosing asthma is a good evaluation. In many cases, a diagnosis of asthma is made based upon history and symptoms at the time of evaluation. The family history should also be considered, as a positive family history increases a person's chances of developing asthma.

Kinds of Tests Used to Diagnose Asthma

- A detailed medical history and physical exam
- Spirometry breathing test - measures airflow into and out of the lungs. A person blows very hard and fast into a tube attached to the spirometer and a computerized sensor calculates and graphs the results. The results demonstrate an individual's airflow rates or the volume forced out within the first second. This indicates whether or not there is airway obstruction.
- Chest and sinus X-rays

Specific tests that may be conducted in diagnosing asthma are explained in more detail:

Bronchial Provocation Test - The bronchial provocation test evaluates how sensitive the airways in your lungs are. A spirometry-breathing test is done before and after a spray is inhaled.

Exercise-Induced Bronchoconstriction Test - exercise induced bronchoconstriction or EIB, is a combined breathing and exercise test. The test can help identify what type of breathing trouble exists, if any, during exercise. A spirometry breathing test is done before and after exercise on a treadmill.

Routine Pulmonary Function Test - pulmonary function testing measures how well a person is breathing. There are different types of breathing tests that can be done during pulmonary function testing. They include spirometry, lung volumes, and diffusing capacity. Spirometry can show how much air a person can breathe in and out. It also shows how fast you can breathe in and out. Lung volumes can provide further information about how the lungs are functioning. Diffusing capacity can show how well the lungs move oxygen from the lungs to the blood.

Additional tests may be conducted in the management of asthma:

- Allergy Intradermal Skin Test
- Allergy Prick Skin Test
- Barium Swallow Study

- Bone Density Test
- CT Scan of Sinuses
- Exercise Tolerance/Exercise for Desaturation Test
- PH Probe Test
- Tailored Barium Swallow Study

What Makes Asthma Worse?

Airways of people with asthma are often chronically inflamed (swollen). As a result, the airways are sensitive to things that make asthma worse. These, either singly or together, cause symptoms in people with asthma. Identifying and controlling or treating things that make asthma worse is essential to good asthma management.

Things that make asthma worse include: irritants, allergens, infections, weather, exercise, emotions, gastroesophageal reflux, and hormonal changes. These vary from person to person.

Irritants and Asthma

Common airway irritants include smoke (e.g. tobacco smoke, smoke from wood-burning or kerosene stoves and fireplaces), aerosol sprays, strong odors (e.g. perfumes, cologne, gasoline fumes), dust, and air pollution. These substances found in the environment can irritate sensitive airways. Cigarette smoke is a very serious asthma.

Allergens and Asthma

A variety of allergens can make asthma symptoms worse. It is important to note that **not** all people with asthma have allergies. Reliable and valid allergy tests are available and a board-certified allergist can guide you through this process. Common allergens include animal dander, saliva and urine from feathered or furry animals, dust mites, (a major component of house dust in humid climates), cockroaches, indoor and outdoor molds, pollens, foods, and chemicals.

Infections and Asthma

Infections can also make asthma worse. Common cold viruses, respiratory infections, sinusitis, and influenza frequently cause an increase of asthma symptoms.

Exercise and Asthma

Exercise or physical activity can make asthma worse; for some it may be the only cause of asthma symptoms. However, exercise is important for everyone and should not be avoided. For many people, using a pre-treatment medication 10-15 minutes before exercise allows them to exercise without experiencing asthma symptoms.

Weather and Asthma

There is not one best weather climate for people with asthma. However, there are certain types of weather that may cause problems for some people with asthma in any climate. Some weather situations that may make asthma symptoms worse include: extremely hot or cold temperatures, windy conditions, and changes in the humidity or barometric pressure.

Emotions and Asthma

Emotions do not cause asthma, but can make asthma worse. Strong feelings can lead to changes in breathing patterns. Times of "good" stress and "bad" stress can cause problems for people with asthma.

Changes In Breathing Patterns and Asthma

Sneezing, laughing, holding your breath, or sleep disorders can cause changes in breathing patterns which may make asthma worse. It is not always possible or desirable to avoid these situations; however, good asthma management may minimize these effects.

Gastroesophageal Reflux and Asthma

Gastroesophageal reflux, or GER, occurs when the acidic contents of the stomach flow back up into the esophagus. This stimulates a reflex that may cause asthma to worsen. Symptoms of heartburn and breathing difficulty at night can indicate GER.

Asthma Treatments and Asthma Medications

Never before have we had so many good, safe oral and inhaled drugs for the treatment of asthma as we do today. It is important that the drug regimen be carefully tailored to the needs of the individual. Learn about different treatment and medication options for asthma below.

Quick-relief Medications

Quick-relief medications are used to treat asthma symptoms or an asthma episode (asthma attack). Many of these medicines are inhaled and start to work within a few minutes.

Examples include: Atrovent® and Combivent®

Short-Acting Beta-Agonists

Short-acting beta-agonists work quickly to relieve asthma symptoms. Beta-agonists relax the smooth muscles around the airways.

Common short-acting beta-agonists include: Albuterol (generic), Alupent® Maxair® and Maxair Autohaler®, Proventil®, Proventil HFA®, Ventolin®, and Xopenex®.

Steroid Pills and Syrups

Steroid pills and syrups are often used to treat severe asthma episodes. They reduce swelling and help other asthma medicines work better.

Common steroid pills and liquids include: Deltasone® Medrol®, Orapred®, Prelone®, PEDIAPRED®

It is important to note that the steroids used in asthma treatment are not the same as the anabolic steroids used illegally by some athletes for bodybuilding. Corticosteroids do not affect the liver or cause sterility.

Long-Term Control Medications

Long-term control medications are taken daily to maintain control of asthma and prevent asthma symptoms. These medicines should be taken every day to prevent asthma symptoms even when the asthma seems better. Long-term control medication is an important part of a treatment program for individuals with persistent asthma. These medicines are helpful in preventing symptoms but should not be used to relieve symptoms. Read about several different types of long-term control asthma medications below:

Anti-IgE is a new form of treatment for asthma management and allergic diseases that is being studied. IgE is an antibody in the immune system, which tells immune cells to release histamine. Histamine is a chemical that starts allergic reactions.

Combination Medications are a newer treatment of asthma that combines an inhaled steroid with a long-acting beta agonist. In studies, a combination medicine like this reduced asthma symptoms and improved lung function. It is a convenient way to take these two medicines, which are both helpful in controlling, moderate to severe asthma.

Common combination asthma medications include: Advair – a combination of salmeterol and fluticasone.

Cromolyn Sodium and Nedocromil - Cromolyn sodium and nedocromil are long-term control medications available in inhaled forms. They help prevent asthma symptoms, especially symptoms caused by exercise, cold air, and allergies.

Inhaled Steroids - Inhaled steroids are the most effective long-term control medicine currently available. They improve asthma symptoms and lung function.

Common inhaled steroids include: Aerobid®, Azmacort® , Flovent®, Pulmicort®, and Qvar®

Leukotriene Modifiers - are long-term control asthma medications that reduce swelling inside the airways and relax smooth muscles around the airways. They are effective at improving asthma symptoms and lung function, but not to the same extent as inhaled steroids.

Common leukotriene modifiers include: Accolate®, Singulair®, and Zyflo®

Long-Acting Beta-Agonists - open the airways in the lungs by relaxing smooth muscle around the airways. They are often used with inhaled steroids as a long-term control medication to open the airways in people with moderate to severe asthma.

Common long-acting beta-agonists include: Foradil® and Serevent®

Devices for Inhaled Medications

There are a number of devices that help deliver inhaled asthma medication directly to the airways: metered-dose inhalers, dry power inhalers, and nebulizers.

Metered-dose Inhalers - The metered dose inhaler (MDI) consists of a pressurized canister of medication in a plastic case with a mouthpiece. Pressing the MDI releases a mist of medication

Dry Powder Inhalers - Several asthma medicines are now delivered in a dry powder inhaler. Since the medicines are dry powder, they must be delivered in a special inhaler.

Common dry powder inhalers include Aerolizer®, HandiHaler®, Diskus®, Rotahaler®, Turbuhaler®

Nebulizers - A nebulizer, or "breathing machine," is another way to take inhaled medicines. A nebulizer treatment is given with an air compressor machine. Pressurized room air is used to create a mist of the medicine solution, which is inhaled for approximately 5-10 minutes.