

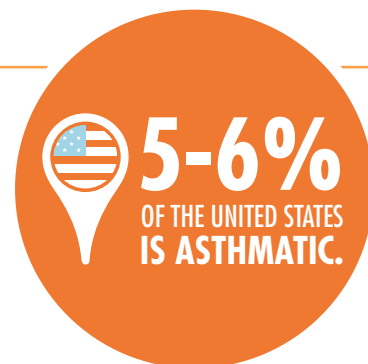
ALL YOU NEED TO KNOW ABOUT ASTHMA



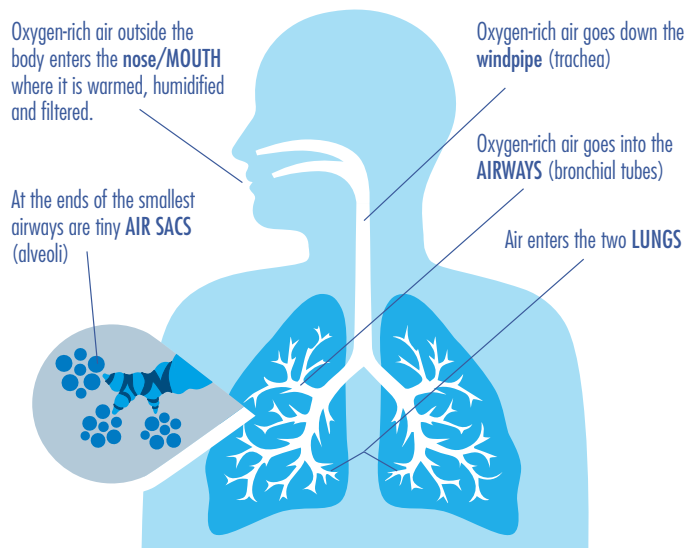
The information in this booklet will help you become familiar with your asthma and its treatment. The more you know about your asthma, the better you can manage it. It is much easier to prevent asthma symptoms than to treat them after they begin. Asthma can start at any age. Although some patients outgrow their asthma, most have it the rest of their lives.

Our goal is to identify the form of asthma you have, outline a plan to prevent asthma problems and treat symptoms, and educate you about your disease and treatments. Understanding the basics of your respiratory system will help.

Each time you inhale, air moves down the windpipe (trachea) and through the bronchial tubes (bronchioles). These tubes, or airways in your lungs, are a vital part of the breathing process. The tubes lead into air sacs called alveoli. Oxygen passes through the thin walls of the alveoli into the blood vessels. Then carbon dioxide passes from the blood through the air sacs to be exhaled. (Diagram 1)



THE BREATHING PATH
DIAGRAM 1 RESPIRATORY SYSTEM



CHANGE IN AIRWAYS

Asthmatic bronchial tube obstruction may occur because of one or more of the following changes:

INFLAMMATION: lining of the tubes becomes inflamed (*irritated*) and swollen.

BRONCHOSPASM: smooth muscles surrounding the bronchial tubes constrict (*narrow*).

MUCUS PRODUCTION: mucus builds up in the tubes, and it may plug them completely.

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ASTHMA SYMPTOMS

When air flows through the narrowed bronchial tubes, one or more of these symptoms may occur.



Individuals with asthma may experience asthma symptoms in different ways. Some people with asthma have constant or daily symptoms. Other people may have periodic attacks. Attacks can vary from mild to severe and can last a few hours, several days, or longer. Symptoms are commonly worse at night or in the early morning.

MUCUS, POSTNASAL DRAINAGE & COUGH

The membranes that line your nose, throat and bronchial tubes are very sensitive. Normally, they secrete (produce) up to two liters of mucus a day to moisten and protect themselves. When these membranes become irritated, congested, and swollen, they secrete an extra amount of mucus. (Diagram 2) This mucus helps to protect the lungs and nose from irritating particles and infection.

If you have asthma, your membranes are more sensitive to irritants, such as smoke, cold air, strong odors and dust, causing them to secrete more mucus than normal.

Infections may cause even more congestion, mucus, and discomfort. However, increased mucus or yellow mucus does not always mean that an infection is present. Check with your

physician if you have more mucus than usual or if it is green or yellow-colored.

Although you may be bothered by excess mucus dripping in the back of your throat, the mucus does not irritate the lining. Forced coughing to bring up the mucus, however, irritates the bronchial tubes and can increase mucus production. Avoid forced coughing.

Some people with asthma have a chronic cough as a result of excess mucus. The coughing reflex acts as a protective mechanism to expel the mucus blocking the air passages. This persistent coughing can again lead to more irritation, more mucus production, and more asthma symptoms. Voluntarily suppressing the cough, although difficult, is helpful.

Do not use cough suppressants when a cough is caused by asthma. They are ineffective. Your allergist can prescribe the appropriate medication for treating your asthmatic condition. Drinking extra water and sucking on hard candy or lollipops (preferably sugar-free) can also help decrease the cough.

ASTHMA SEVERITY DEFINITIONS CHART

	MILD EPISODIC	MILD PERSISTENT	MODERATE PERSISTENT	SEVERE PERSISTENT
CLASSIFICATION BY WORST SYMPTOM SYMPTOMS	2X OR FEWER PER WEEK	MORE THAN 2X/WEEK FLARES MAY LIMIT ACTIVITY	DAILY FLARES LIMIT ACTIVITY	CONTINUOUS LIMITED PHYSICAL ACTIVITY
NIGHTTIME SYMPTOMS	2X OR FEWER PER MONTH	3-4X/MONTH	MORE THAN 1X/WEEK	FREQUENT
LUNG FUNCTION FEV₁ OR PEF	MORE THAN 80% PREDICTED	MORE THAN 80% PREDICTED	MORE THAN 60% TO LESS THAN 80% PREDICTED	LESS THAN 60% PREDICTED

ASTHMA TRIGGERS

Most people with asthma have inflamed or swollen airways all the time. This makes the airways very sensitive to certain triggers. Triggers vary among people and include anything that causes asthma symptoms to flare. Following are some common triggers. As you read this section, think of the factors present in your surroundings (school, work place, home and environment) that trigger your asthma.

ALLERGY

Asthma may be triggered by an allergic reaction to animals, dust mites, pollens, mold, or other inhaled substances. There are two main forms of allergic asthma, acute and chronic. In the most common type, acute, symptoms are seasonal or with clear exposures (such as to a cat). Chronic allergic exposure can cause the asthma to be worse all the time. Dust mites, living with the animal you are allergic to, and mold often cause this. Allergy testing is very helpful in identifying which substances really cause your problem.

ENVIRONMENT

Cigarette smoke, dust, air pollution, strong fumes, and cold air may irritate the lining of the bronchial tubes. In addition, seasonal changes may worsen asthma symptoms.

OCCUPATIONAL EXPOSURES

Exposure to substances found at the workplace, such as flour (Baker's asthma), wood dusts, and chemicals may trigger asthma symptoms.

EXERCISE

Exercise is an essential part of a healthy lifestyle, but some people have asthma symptoms during or after exercise. Learning to exercise safely is crucial for managing your asthma.

INFECTION

Respiratory infections commonly trigger asthma symptoms that can be severe in some people. These infections are usually caused by a virus. Medications for bacterial infection (antibiotics) do not work against viral infections. Antibiotics are not routinely needed for asthma attacks. However, more asthma medication may be needed to treat the worsening asthma symptoms caused by a virus (common cold). Viruses that cause asthma attacks are spread through contact. Frequent hand washing and limited hand-to-nose contact may help prevent these infections.

Asthma attacks triggered by cold viruses can lead to severe breathing difficulty. Early treatment with asthma medications and consultation with your physician is recommended.

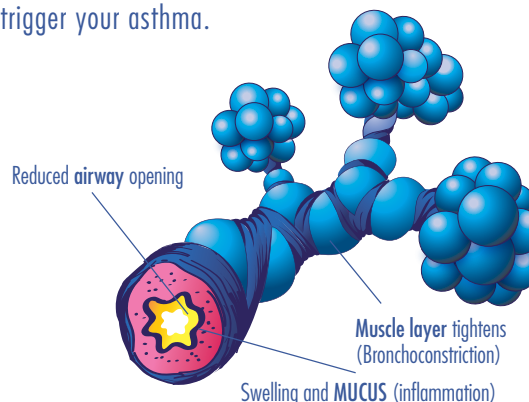


Diagram 2 Asthma is a chronic lung disease that affects mainly the bronchial tubes by blocking airflow through these tubes. During an asthma attack, the tubes become inflamed and obstructed, and the air sacs become enlarged.

Adults with chronic asthma should receive yearly influenza shots in the fall. Pregnant women and parents of children with asthma should consult their allergist about the need for influenza immunization.

The pneumococcal vaccine also is recommended for adults with chronic asthma. This vaccine helps prevent one form of pneumonia.

Side effects from both the influenza vaccine and the pneumococcal vaccine include a sore arm and flu-like symptoms (a feverish feeling and aching). These side effects last about 48 hours and occur in a small percentage of people receiving the vaccines.

ASPIRIN

Some people develop severe asthma attacks after taking aspirin or aspirin-like drugs including ibuprofen, indomethacin, naproxen, and others. Many of these people also have nasal polyps (small, non-cancerous tumors in the nose). If you are sensitive to aspirin, check the labels of all medications before using them. Many pain-relief and cold-relief products sold over the counter contain aspirin (also called acetylsalicylic acid). Other pain medications, such as sodium salicylate, acetaminophen (Tylenol) and propoxyphene (Darvon), may be taken instead.

DIAGNOSE & MONITOR ASTHMA

If your allergist thinks you have asthma, tests may be done to confirm the diagnosis, determine the severity of your asthma, and identify your triggers. This allows your allergist to make Your Asthma Treatment Plan and modify it as needed. (See Asthma Severity Definitions Chart)

LUNG FUNCTION TEST

The lung (pulmonary) function test detects and measures airway obstruction and response to treatment. It is often repeated on a regular basis. The lung function test will help you and your physician determine how severe your asthma is and how much medication you need. Furthermore, the test will help assess if your current therapy program is effective. Pulmonary function tests (also called spirometry) are among the most important tests for asthma.

METHACHOLINE CHALLENGE

Some people with asthma have normal pulmonary function most of the time but have “twitchy” airways that react excessively to irritants. Your allergist may order a test called a Methacholine challenge. For this test, you breathe in a medication and the effect on your lungs is measured to see if

you react like a person with asthma. The effect of the medication is brief and can be reversed if needed with bronchodilator medicines.

X-RAYS

Chest x-rays usually do not help in the diagnosis or treatment of asthma. However, chest x-rays may be taken to be sure you do not have other conditions that mimic asthma.

PEAK FLOW METER

Peak flow is the maximum speed that you can blow air out of your lungs after taking a full breath. You can measure your peak flow with a peak flow meter. A peak flow meter measures changes in the size of your airways. It measures the rate of flow in liters per minute (peak flow rate).

TEST FOR ALLERGIES

In certain patients, regularly recording peak flow rates and keeping a diary of symptoms can help identify what triggers their asthma, give an early warning of an upcoming attack, and let them prevent worsening of their asthma by starting their action plan.

THE SKIN TESTS

An allergy skin test may help diagnose the cause of the allergy. Skin tests are done on the arms or back using either the prick or intradermal method.

In the prick technique, a drop of an allergy-producing substance (allergen) is applied to the skin. The skin is then scratched or pricked. In the intradermal method, a tiny amount of allergen is injected into the skin. Skin tests for most allergens are safe, and the results are available in 20 to 30 minutes. Antihistamine and antidepressant medications affect skin tests and must be stopped before tests begin. Some antihistamines can interfere with allergy skin tests for weeks. Check with your physician about stopping medications.

Skin tests for tobacco smoke allergy are not useful because tobacco smoke is an irritant, not an allergen.

BLOOD ALLERGY TESTS

Allergies can also be diagnosed using a blood test, such as the ImmunoCap. They give information similar to the skin test. However, they are more expensive, may miss identifying some allergies, and also take longer to determine the results. The blood test can be used when a skin test would not be suitable. For example, it can be used when a person has a skin disease which does not allow skin tests to be done, or when taking an antihistamine or other medication that might affect skin test results.

Both skin and blood allergy test results must be interpreted by a physician who is experienced in diagnosing and treating allergies and who is familiar with your medical history.



MANAGE ASTHMA



The Lung Function test “spirometry” detects and measures airway obstruction and response to treatment.

The goal of asthma management is to achieve the best possible control of your asthma at all times with the least amount of side effects from asthma medication. With proper care and treatment, you can usually control your asthma and continue your normal activities.

ENVIRONMENT

The best way to manage your asthma is to avoid triggers that aggravate or cause your symptoms.

ALLERGENS

Avoidance is the most effective way to manage allergic asthma.

If you are allergic to airborne pollens and molds, use air conditioning in your home, your car, and at work. Keeping doors and windows closed is an effective way to keep out airborne pollens and molds. Dry your laundry inside during pollination times. Clean up areas of obvious mold growth. Consider a dehumidifier for damp basements. If you have seasonal allergic asthma, it may help to leave the geographic area during the allergy season. For example, if you are allergic to ragweed, consider going to places such as the Rocky Mountains or Northern Minnesota during the ragweed season.

If you are pet allergic, removing them from your home and cleaning the house thoroughly may give complete relief of symptoms. If you decide to keep your furry pets, wash them weekly. After washing your cat once a week for several weeks, you may reduce the amount of its allergen that floats in the air (airborne allergen). A special filter such as a HEPA can reduce the dander level in the air. Keep your pets outside as much as possible. Do not let them on your bed or even in your bedroom. Also, keep them out of other rooms in which you spend a lot of time. If you are allergic to animals, do not buy furniture or rugs that are made with animal hair.

For dust mite allergy, consider encasing the mattresses and pillows in allergy control barriers, washing the blankets

and sheets weekly in hot water, and keeping the humidity down. Have the bedroom out of the basement and have smooth floors where possible. Total avoidance is hard and most patients need a daily controller. If you are allergic to cockroaches, use a roach control method to rid your home of these pests.

IRRITANTS

If you have chronic asthma, avoid irritants such as dust, smoke, and cold air. Obviously, you cannot completely avoid all irritants, but you can take precautions.

Do not smoke. Try to avoid smoke-filled surroundings. Being in an enclosed space with a smoker can trigger asthmatic symptoms. Make sure your hobbies are not contributing to asthma symptoms. Paint fumes, wood dusts, paint removers and similar irritants can make asthma symptoms worse.

Remodeling a room in a house can increase symptoms of asthma due to the presence of these irritants and others, such as dust. If you have a forced-air furnace and are irritated by dust, use a filter for dust control and change it frequently. Avoid doing work that creates dust or working in a dusty environment. Wear a dust mask when it is impossible to avoid being exposed to dust. In cold temperatures use a cold-air mask that covers your mouth and nose. Avoid smoke of all types: tobacco smoke, smoke from burning leaves, burning rubbish and wood stoves. Smoke of any kind irritates the eyes, nose, and bronchial tubes.

MOVING TO A DIFFERENT CLIMATE

Most people with asthma will not be helped by moving to a different climate.

ADOPT A HEALTHY LIFESTYLE

When possible, reduce tension and fatigue. Although the effects of fatigue and tension on asthma vary from person to person, both can increase the effects of other factors on asthma. Eat nutritious meals, drink adequate water, and get adequate sleep. Balance work and relaxation.

EXERCISE

Exercise may aggravate asthma symptoms, but symptoms can be controlled by proper preparation and pre-medication. A number of Olympic athletes with asthma compete regularly and have won gold medals!

Benefits of regular exercise include:

[Reduced chance of further exercise-induced asthma](#)

[Increased sense of well-being](#)

[Improved exercise tolerance & endurance](#)

[Improved quality of life](#)

MEDICATIONS

If medications are needed to help you manage your asthma, your allergist will help you decide what is best for you. There are many different medications available, and the type prescribed will depend on the severity of your asthma.



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Some asthma medications can provide quick relief during an asthma attack by relaxing airway muscles to allow more normal breathing. This type of medication is called a bronchodilator. They are the primary “relievers.”

Other asthma medications are taken regularly to prevent or reduce inflammation and excessive mucus

production and are called “controllers.” They are generally anti-inflammatory medications and need to be taken regularly even if you do not have symptoms.

Children or adults unable to use an inhaler are often treated with a nebulizer. This is a device that vaporizes liquid medications into a

fine mist that can be inhaled through a mouthpiece or mask; a spacer device can also be used by many. Less commonly, other forms of medications are used, such as capsules of dry powder for inhalation.

Never discontinue or cut back on your medications without first discussing it with your allergist.

SYMPTOM CONTROLLERS

Patients with persistent asthma should use a controller medication every day. The most effective controllers are inhaled corticosteroids. These agents should be taken regularly to control airway inflammation and can be adjusted based upon asthma severity. While any of the controllers can be chosen for mild persistent asthma, inhaled corticosteroids are the treatment of choice for moderate and severe persistent asthma. Inhaled corticosteroids can be used with a second controller such as an inhaled long acting bronchodilator. Some patients with severe asthma may require four controller agents.

Other controller options include: Allergen Specific Immunotherapy (allergy shots or sublingual–under the tongue); Leukotriene Agents (Montelukast-Singular, Zafirlukast-Accolate, Zileuton-Zyflo); Anti-IgE (Omalizumab /Xolair); Cromolyn, Theophylline, Long-acting bronchodilators (Formoterol or Salmeterol); Oral Steroids (Prednisone) and Bronchial Thermoplasty.

Some patients with severe asthma require the continuous (daily or alternative day) use of oral corticosteroids. The dose of corticosteroids must be individualized, balancing the need for asthma control with the risk of corticosteroid-induced adverse effects.

CORTICOSTEROIDS

Corticosteroids reduce inflammation and swelling of the bronchial tube lining. They can be life saving. Corticosteroid medications can be given by inhalation, pill, intramuscular injection or through a vein (IV).

Seven types of synthetic corticosteroids are inhaled as sprays: budesonide (Pulmicort), fluticasone (Flovent, Advair, Arnuity), mometasone (Asmanex, Dulera) beclomethasone (Qvar), triamcinolone (Azmecort), ciclesonide (Alvesco) and flunisolide (AeroBid, Aerospan). These sprays provide the benefits of corticosteroids with fewer side effects. Occasional side effects include:

INHALED STEROID SIDE EFFECTS

Mouth & Throat Irritation

Hoarseness

Thrush (a yeast infection in the mouth & throat)

Cough

You can decrease the chance of getting thrush by using a spacer and/or by gargling and rinsing your mouth with water after using these aerosols. Generally inhaled corticosteroids are considered safer than corticosteroid pills or injections. However, if you are using high doses of inhalant you may wish to speak to your physician regarding risks and benefits.

Corticosteroid sprays are not bronchodilators and will not give immediate relief in an acute asthma attack. Their effect on the bronchial tubes comes about more slowly and helps to prevent future asthma attacks. It is important to take these sprays on a regular basis.

Medications available to be taken by mouth include prednisone, dexamethasone (Decadron), triamcinalone (Aristocort) and methylprednisolone (Medrol). While corticosteroids taken in pill or injection form are effective in reversing severe asthma, they may cause significant side effects. Side effects from long-term systemic use may include:

ORAL STEROID SIDE EFFECTS

Round face, thin skin, easy bruising, weight gain, increased appetite

Increased facial & body hair growth

Suppression (*shrinking*) of the adrenal & pituitary glands

Cataracts, increased risk infection, high blood pressure, diabetes

Weakening of the bones (*osteoporosis*), slowing of growth in children

Sleep disturbances & emotional problems

A form of arthritis of the hips (*avascular necrosis*)

Discuss the use of these medications with your physician. Inhaled corticosteroids generally do not cause these side effects at usual doses.

ANTI-IL-4

Dupilimab is a monoclonal antibody that blocks the effects of interleukins 4 and 13, thus calming down the asthma and atopy cascade. It is an injection for patients with severe asthma, atopic dermatitis, or nasal polyposis.

ANTI-IL-5

Benralizumab, Mepolizumab, and Reslizumab are monoclonal antibodies against Interleukin-5. They are used for severe persistent eosinophilic asthma and are given subcutaneously or intravenously. The frequency and severity of asthma flares is reduced with therapy.

ASPIRIN DESENSITIZATION

For patients with aspirin exacerbated respiratory disease (asthma gets worse with aspirin and other NSAIDs, nasal polyps) desensitization with aspirin followed by long term daily aspirin therapy can better control the asthma and the return of the nasal polyps. It must be continued daily or the desensitization effect is soon gone and the reactions again happen.

CROMOLYN

Cromolyn (Intal) is another anti-inflammatory drug that helps prevent narrowing of the bronchial tubes in people with allergic asthma and exercise-induced asthma. It is inhaled through the mouth and works best if used before exposure to allergens or exercise. It is not a bronchodilator and will not help an asthma attack once it is in progress. Cromolyn seldom has side effects.

LEUKOTRIENE MODIFYING AGENTS

These medicines are taken by mouth and can decrease the number of asthma symptoms if used regularly. They decrease the side effects of special messengers called leukotrienes. Singulair is most often used and helps with exercise induced asthma as well as normal asthma.

LONG-ACTING BRONCHODILATORS

There are two families of these medications. Theophylline is given by mouth; helps open the bronchial tubes and make the diaphragm muscles stronger for hours. Monitoring blood levels is needed for safety.

For asthmatics, the long-acting beta agonists Formoterol, Salmeterol, and Vilanterol are only given with an inhaled steroid for safety reasons. This combination is the preferred next step if plain inhaled steroid products are not controlling the asthma.

Anticholinergics (or muscarinic antagonists) can produce opening of the airways for some asthmatics. Tiotropium is a long-acting form used in asthma and COPD. It is used with caution in patients with glaucoma or urinary issues.

Short-acting relievers are used with these drugs as needed.

ALLERGY IMMUNOTHERAPY

Allergy immunotherapy is also called desensitization, hyposensitization, allergy shots, or allergy drops. It is a form of treatment that can make you less sensitive to allergens. It is helpful for allergic asthma and allergic rhinitis, especially for allergies to trees, grasses, weeds, cats, and dust mites. It can also help with mold or dog allergies. It is generally not helpful for non-allergic asthma, rhinitis or nasal polyps.

Allergy shots are the most effective form of immunotherapy, which involves regular injections of the allergen(s) to which you are allergic. The injections start with a small dose once or twice weekly and gradually increase to the maximum dose determined by your allergist. Then the injections are extended gradually to monthly doses and continue year-round.

Approximately 70 to 80 percent of people who have allergic asthma or allergic rhinitis benefit from allergy shots. The inconvenience and expense of going to the doctor for immunotherapy must be balanced against the severity of the symptoms, the cost of the other drugs, and the side effects of these other medications.

Allergy drops or tablets are taken under the tongue daily (Sublingual Immunotherapy SLIT). They gradually decrease the allergy symptoms. Unlike shots, you are typically only treated for an allergy to one thing such as ragweed or grass. SLIT is only effective for a few allergens.

While it is uncommon, you can have an allergic reaction to the allergy immunotherapy. Life-threatening reactions and deaths have occurred, but are extremely rare. You will be asked to wait in your physician's office for 30 minutes following an injection so that if a reaction occurs, it can be properly treated.

After five years, consideration can be given to stopping the immunotherapy. Most patients continue to enjoy relief for years after stopping the injections. If no benefit is seen after a year, a reevaluation of this therapy is suggested.

ANTI-IGE

In allergic asthmatics, giving anti-IgE monoclonal antibodies (Xolair) can significantly decrease the severity of asthma. Given as injections every two to four weeks, it begins to help in two or three months. It is reserved for moderate to severe persistent asthma.

BRONCHIAL THERMOPLASTY

Bronchial Thermoplasty involves a specially trained pulmonologist delivering high-frequency sound waves directly to the bronchial walls. A long lasting improvement is seen after the set of three treatments.

EXPERIMENTAL

Many other therapies for asthma are under extensive study. Ask your allergist about other treatment options for your situation.

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RELIEVERS

SHORT-ACTING BRONCHODILATORS

Bronchodilators open up the bronchial tubes and relax muscle spasms in the walls. Short-acting bronchodilators are beta agonists and anticholinergic medications.

Beta agonists stimulate beta receptors on bronchial smooth muscles. They include albuterol (ProAir, Proventil, Ventolin) and levalbuterol (Xopenex). They are used “as needed” to help shortness of breath, tight chest, wheezing and cough. Needing them more than every four hours means your asthma is out of control and you need to adjust therapy, do the next step on your asthma plan or contact your allergist. Beta agonist side effects could include shaking, heart palpitations, or feeling hyper.

Call your physician if you experience increased or prolonged side effects.

Anticholinergic medications open the airways by blocking cholinergic nerve impulses. Ipratropium bromide aerosol alone (Atrovent) or with albuterol (Combivent) is often used for maintenance treatment of bronchospasm in chronic obstructive pulmonary disease. This medication lasts three to six hours. It is used off-label for asthmatics and can be helpful for some patients. The most common side effect is a dry mouth. It can aggravate glaucoma if sprayed in the eyes.

ORAL STEROIDS

A short burst of an oral corticosteroid such as prednisone is often used to help relieve worsening of asthma in conjunction with the short-acting bronchodilators (albuterol). Typically, this will be for five days. Your action plan may tell you to start this in certain circumstances. As there are many possible side effects, it is limited to only short bursts when truly needed.

EMERGENCY TREATMENT

Emergency treatment may not be limited to the above medications. Home emergency kits may include adrenaline in injection form, such as EpiPen Auto-Injector. The emergency room is available when outpatient therapy is not working.

CONCLUSION

People with well-controlled asthma can exercise, sleep well, and work or play without symptoms of asthma or serious side effects from their medications. However, managing asthma may require some life adjustments such as avoiding certain triggers, self-monitoring with regular use of your peak-flow meter, taking medications, and scheduling regular visits with your allergist. If your asthma is not controlled, discuss this with your allergist. With the help of medical treatments and preventative measures, most people with asthma are able to lead active and fulfilling lives.



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