

RESPIRATORY SYSTEM



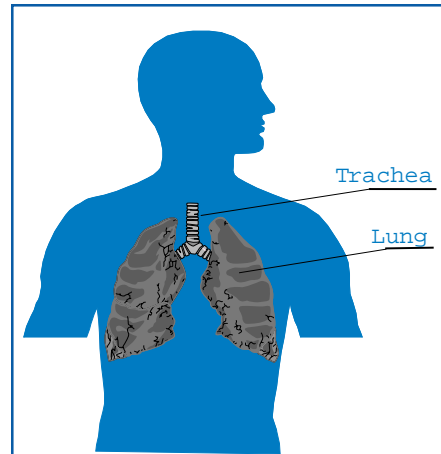
Respiration is the act of breathing (inhaling and exhaling). The body cannot store oxygen, so we breathe to move air into and out of the lungs.

When referring to the amount of work each organ is responsible for in the human body, the lungs are second only to the heart. Each lung expands and contracts between 12 and 20 times a minute to supply the body with the fresh oxygen needed by the blood and, just as important, to expel carbon dioxide (waste produced by the burning of food for energy). The air is sometimes polluted with dust, chemicals, pollen, bacteria, and viruses.



THE RESPIRATORY SYSTEM

Inhalation occurs when the air enters the nose, passes through the trachea (windpipe), and into the lung where it is routed through the bronchi, (branching airway tubes) that become smaller as they reach deeper into the lung. The smallest of the bronchi, (bronchioles), open into balloon-like sacs called alveoli (air sacs). These are separated from the blood vessels of the lung by a very thin membrane and it is across this membrane that the exchange of gas occurs.



ACUTE RESPIRATORY CONDITIONS

Upper respiratory diseases represent up to 70 percent of acute illnesses (severe symptoms that attack suddenly and resolve quickly) treated in the United States. Common illnesses that occur within the respiratory system can be separated into upper and lower respiratory categories, although widespread respiratory illnesses can affect both tracts.

■ THE COMMON COLD AND FLU (INFLUENZA)

Common colds and the flu (influenza) are very ordinary respiratory diseases caused by highly infectious viruses. Antibiotics are not helpful in treating a cold or the flu. Fortunately, the course of the disease usually lasts only one to three weeks unless there is a bacterial complication, which could result in bacterial bronchitis or pneumonia. Over the counter medication can be used effectively to reduce the symptoms of the disease. If there are no complications, the common cold runs its course in one to three weeks.

Warning: Contact your physician if a fever of more than 101 degrees persists for longer than 48 hours; if you are unable to retain fluids (by continued vomiting); or if you fail to respond to simple medication.

SIGNS AND SYMPTOMS

Cough ranging from mild, harsh, or forceful; soreness in the chest; fever between 99 and 101 degrees F; chills; body weakness; fatigue.

PREVENTION

Prevent the flu by receiving a flu shot in the late fall. This needs to be given each year. The immunization can be given by your physician or health department for a nominal fee.

TREATMENT

Drink lots of water.

Get plenty of rest.

A room humidifier is helpful, particularly with younger children.



DRUG TREATMENT

Antibiotics have no place in the management of a common cold caused by a virus. Good scientific evidence has shown that antibiotic use will lead to dangerous antibiotic-resistant bacteria and will not alter the course of the disease.

The following medications may help reduce symptoms:

Analgesics for aching and fever may be used. Some over the counter options are aspirin (but not in children), acetaminophen, and nonsteroidal anti-inflammatory drugs (NSAID).

Throat Soothers Honey, hard tart candy with citric acid (sour cherry, lemon, etc.), or medicated lozenges are available over the counter.

Cough Suppressants and Expectorants Cough suppressants, expectorants and decongestants, available over the counter, usually contain a cough suppressant and a liquefying agent to make a cough more tolerable. Warm liquids also help soothe the throat and liquefy the mucus (but not milk). Breathing humidified air may be helpful. Codeine and hydrocodone cough suppressants (antitussive) are available by prescription. They work by suppressing the cough center of the brain. An over the counter antitussive, dextromethorphan, is available in cough syrups and lozenges. An antihistamine, diphenhydramine, has a antitussive effect and may be sedating.

Zinc Recently zinc has been shown to be effective in treating viral caused respiratory illnesses. Zinc lozenges **are available over** the counter. Follow the instructions carefully to avoid overdosing.



■ BRONCHIOLITIS

This is a respiratory infection caused by an influenza virus or a bacterium and specifically affects the bronchioles (small airways to the lungs). The infection causes an excessive amount of mucus. Although this is not serious in older children and adults, in an infant, the airway is much smaller and narrower and may become partially or completely blocked. This causes an infant to have difficulty with inhaling and exhaling and is a common winter occurrence in children less than two years of age. Many times it is worsened by an allergy that aggravates the spasms of the airways even more. Bronchiolitis can be serious if the airways become blocked. With intense management and treatment, most infants recover within two days to a week. Approximately one-half of the infants who experience bronchiolitis will have later episodes of wheezing and may be more susceptible to respiratory infections.

SIGNS AND SYMPTOMS	Wheezing; exhaling heavily; rapid breathing and a rapid heart rate; productive cough.
TREATMENT	Hospitalization may be necessary, especially in an infant less than two months of age. The treatment consists of administering moist air, perhaps with extra oxygen.
DRUG TREATMENT	Antibiotics may be administered when a bacterium infection is found.

■ ACUTE BRONCHITIS

When the lining of the principal air passages of the lung (trachea and bronchi) becomes inflamed, the condition is called bronchitis or tracheobronchitis. Virtually everyone experiences bronchitis at one time or another. If the condition becomes chronic (begins slowly and lasts a long period of time), it is more serious (See Chronic Respiratory section). In most cases, an infection is caused by a virus, as in the common cold. Occasionally a bacterium causes the condition. When it reaches the peak of infection, a deep cough develops, producing yellowish-gray sputum. If you have a fever, if your chest discomfort leaves you breathless, or if you cough up blood, call your physician. In most cases, however, since it is most often caused by a virus, there is little that a physician can do therapeutically. In virtually all cases, acute bronchitis disappears in a matter of days and there are no lasting effects.

SIGNS AND SYMPTOMS	Deep, productive cough; chills; overall malaise and slight fever; soreness with a feeling of constriction in the chest.
TREATMENT	Drink extra liquids; get plenty of rest.
DRUG TREATMENT	Aspirin for a fever, nonprescription cold medication (See Common Cold); cough suppressant; antibiotics for a secondary bacterial infection.

For those persons with chronic respiratory conditions, such as asthma, emphysema, or congestive heart failure, consult your physician.



■ PNEUMONIA

Pneumonia describes an inflammation of the tissues of the lung. There are a variety of types of pneumonia that range in severity from mild discomfort that accompanies a cold, to life threatening conditions. The causes of pneumonia may be bacteria (pneumococci, staphylococci and streptococci), influenza or other viruses, or even a chemical irritant (as inhaling smoke or toxic gases). The seriousness of this disease depends on your general health. If it occurs in an otherwise healthy individual, the course of recovery is usually predictable. However, if the person who has pneumonia has heart failure, emphysema, asthma, chronic bronchitis, cancer, or is elderly, the pneumonia can quickly become life-threatening. Proper medical care, rest, and careful monitoring are essential in managing pneumonia.

Community Acquired Pneumonia gets its name from the way it is acquired; from a community epidemic. Common causes of this condition are pneumococci, mycoplasma, and the influenza virus.

Hospital Acquired Pneumonia occurs when a patient acquires pneumonia in the hospital. Often the type of infectious agent found in hospitals makes the course of disease more extensive.

Aspiration Pneumonia is caused by taking a foreign matter or vomiting into the lungs. It can happen during or after a patient's surgery.

SIGNS AND SYMPTOMS

Cough, occasionally with blood; pain in the chest; chills; high fever.

TREATMENT

See your physician immediately as serious pneumonia can be life-threatening. The treatment of the condition will depend on the cause (viral or bacterial).

DRUG TREATMENT

If the cause is bacterial, antibiotics are the most successful treatment. Hospitalization may be necessary if the pneumonia is severe enough to require administration of oxygen and intravenous fluids.



■ LEGIONNAIRE'S DISEASE

Legionnaires' disease was first identified in July of 1976, when a sudden, virulent outbreak of pneumonia occurred at a convention hotel in Philadelphia, primarily among delegates attending the American Legion Convention. The cause eventually was identified as an unknown bacterium that was subsequently named *Legionella pneumophila*, because of the situation surrounding the original outbreak. The organism is now worldwide and is mostly characterized by its ability to thrive in warm, moist areas of the air-circulation systems of large buildings. Typically, legionnaires' disease is a highly potent disease, causing pneumonia severe enough to require hospitalization. Although most people recover, some hospitalized patients suffer from respiratory failure (acute respiratory distress syndrome or ARDS), which is fatal in about 15 percent of the cases.

SIGNS AND SYMPTOMS	Malaise (body weakness); slight headache; fever and shaking chills; cough that produces mucus; shortness of breath; chest pain.
TREATMENT	Hospitalization may be required with intravenous administration of fluids, and possibly oxygen.
DRUG TREATMENT	Antibiotics are most effective against legionnaires' disease. Erythromycin seems to be the safest and most effective antibiotic.

■ LUNG ABSCESS

A lung abscess is a cavity in the lungs that is filled with pus. It usually occurs when an infectious material from the mouth or throat is inhaled and an infection becomes established in the lungs. Dental disease is often the source of the infection. Infectious organisms in the mouth are usually inhaled when a person is unconscious as a result of excessive alcohol consumption, general anesthesia, excessive sedation, or a disease of the central nervous system resulting in a coma or unconsciousness. In adults over 55 years of age who smoke, lung cancer may cause a lung abscess by blocking the bronchial tube. Sometimes a lung abscess occurs as a complication of pneumonia. Rarer causes of lung abscesses are infections caused by tuberculosis, fungal, or parasitic organisms. In most cases, only a single abscess develops in the lung. Occasionally, multiple abscesses appear.

SIGNS AND SYMPTOMS	High and fluctuating fever; sweats and chills; shortness of breath; productive cough; malaise (body weakness) and loss of appetite.
DRUG TREATMENT	Antibiotics are necessary. If the abscess is from tuberculosis or a fungal disease of the lungs, a different treatment will be advised.
SURGICAL TREATMENT	Draining of the abscess with a tube, or removal of the lung part with the abscess is sometimes necessary.



■ EMPYEMA

Only a tiny amount of lubricating fluid is present in the pleural space between the two layers of the lungs. The fluid allows them to slide over each other during breathing. Empyema (pus in the pleural space) occurs if an infection is present in this space and there is an accumulation of pus. The buildup of this infected fluid puts pressure on the lungs that cause shortness of breath. You may experience chest pain on deep breathing due to pleurisy (inflammation of the pleural membrane). Empyema usually occurs as a complication of bacterial pneumonia, a lung abscess, or other respiratory infections.

SIGNS AND SYMPTOMS

Dry cough; fever and night sweats; weight loss; shortness of breath; chest pain on deep breathing.

DRUG TREATMENT

Antibiotic therapy is required.

SURGICAL TREATMENT

Draining of the infected fluid from the chest is sometimes required. Thoracotomy (a surgical incision in the chest wall for insertion of a drainage tube) is often necessary to ensure removal of the fluid.

■ PLEURISY AND PLEURAL EFFUSIONS

Pleurisy is inflammation of the pleura (the double membrane that surrounds each of the lungs). Pleural effusions are accumulations of fluid in the pleural space. Pleurisy and pleural effusions occur as complications of an underlying disease such as tuberculosis, pneumonia, pulmonary embolus, pancreatitis, cancer, congestive heart failure, or trauma to the chest.

SIGNS AND SYMPTOMS

Shortness of breath; chest pain; dry cough; fever and chills.

DRUG TREATMENT

Analgesics and anti-inflammatory drugs are generally prescribed. Sometimes codeine is prescribed to control coughing that can be very painful.

SURGICAL TREATMENT

In some cases, the pleural effusion needs to be drained for several days by means of a chest tube.



CHRONIC LUNG CONDITIONS

Chronic lung disorders (progressive and of long duration) obstruct the airways and reduce airflow. They have increased in every part of the world and are most common in people who smoke and spend time in urban and industrial areas. Lung disorders may be present from birth or may develop after several years. Some may come on suddenly without any warning, or after an injury. Inhaling gases, fumes, organic chemicals, or dust have contributed to some disorders and others have no known cause. Lung disorders are grouped into three categories: inflammation due to inhalants, infections, allergies; cancer; and inherited.

There are three chronic lung disorders in which obstruction to the flow of air is a major symptom. One is emphysema, the second is chronic bronchitis, and the third is asthma (discussed in its own section). The first two disorders are usually due to smoking and often referred to as chronic obstructive pulmonary disease (COPD).

■ ATELECTASIS

Atelectasis consists of a collapse of portions of a lung or sometimes an entire lung. It is caused by obstruction of bronchial passages in the lungs (commonly by a plug of mucus), accidental inhalation of a foreign object, or outside pressure from a tumor, aneurysm, or enlarged lymph node. It may also be associated with a bacterial infection. There is usually pain on the affected side.

SIGNS AND SYMPTOMS

Shortness of breath; fever; decreased blood pressure; rapid heart rates; severe, hacking cough.

TREATMENT

If coughing, suctioning, or other therapeutic measures do not work, a bronchoscopy (a tube inserted through the windpipe to allow visualization and suction of the foreign object) may be necessary.

■ ASTHMA (See separate section on Asthma this chapter)



■ CHRONIC BRONCHITIS

This disorder consists of chronic inflammation and thickening of the lining of the lung and bronchial (airway) tubes, caused by inflammation. Inflammation produces mucus and becomes a breeding ground for bacteria. Although bronchitis usually has a rapid onset and short course, it occurs due to a virus or bacteria. Another common cause is smoking and inhaling chemical irritants. This infection often precedes a common cold. At first, the cough is most bothersome during a humid spell or cold weather. Eventually, it persists with symptoms of hoarseness and breathlessness. The disease is more prevalent in patients over the age of 35.

SIGNS AND SYMPTOMS

Chronic cough that produces mucus; shortness of breath.

DRUG TREATMENT

A bronchodilator (for inhaling).

Oxygen therapy may be required.

Antibiotics will be prescribed if an infection is found.

HEALTH TIPS

If you smoke cigarettes, stop smoking.

Avoid aggravating fumes such as paint odors, exhaust fumes, dust.

Avoid extremely humid or dry and cold air.

Avoid contact with anyone who has a cold or a respiratory infection.

Get a yearly influenza vaccine.

Drink large amounts of fluid to dilute the mucus. Beverages containing caffeine and alcohol, tend to remove fluid from your body, so limit the amounts you consume.

■ COR PULMONALE

“Cor pulmonale” is the enlargement and eventual failure of the right ventricle of the heart, usually due to an obstruction of the pulmonary circulation. Blood goes from the heart to the lungs where carbon dioxide is removed and oxygen is added. However, when the lung is impaired by emphysema, fibrosis, or other chronic lung diseases, it takes more effort to pump the blood. Although the heart may compensate for a while, eventually it fails, resulting in a very serious, life threatening disease.

SIGNS AND SYMPTOMS

Chronic cough that produces sputum; shortness of breath with exertion; wheezing.

TREATMENT

Oxygen and diuretics (to decrease blood volume).

Restriction of salt and fluid intakes (to avoid a fluid overload).



■ CYSTIC FIBROSIS

Cystic fibrosis is an inherited disease that affects both the respiratory and digestive systems. It is the most common fatal hereditary disease in children in the United States, affecting approximately one in every two thousand infants. It usually begins in infancy and is the major cause of severe chronic lung disease in children. Cystic fibrosis affects the mucous and sweat glands of the body. The cause and primary defect of cystic fibrosis are unknown. This occurs because the mucus in the child's lungs is very thick and sticky. Instead of serving as a lubricant, it clogs the respiratory system and allows bacteria to grow within it, lowering the body's normal defenses. Cystic fibrosis is very serious and ultimately fatal. The median survival is approximately 20 years. Approximately one-half of these patients live to age 26, and as techniques are improved, some survive beyond age 30. Other mild forms of the disease do not show symptoms until adulthood. If you have a child with cystic fibrosis, each additional child will have a 25 percent chance of having the disease, a 50 percent chance of being a carrier, and a 25 percent chance of having normal genes. A concept of total management is developing and looks promising in the medical care of cystic fibrosis.

SIGNS AND SYMPTOMS

Shortness of breath; chronic cough; tightness of the chest; wheezing; exercise intolerance; weight loss with poor appetite and energy; chronic diarrhea and malnutrition.

TREATMENT

Treatment is continued through life with careful monitoring and supervision.

A child should be on a high protein, low-fat diet, eg, skim milk instead of whole milk.

A pancreatic enzyme should be taken to replace the missing digestive enzymes.

Exercise sessions are important to loosen and promote drainage of the mucus.

DRUG TREATMENT

Antibiotics are used to control pulmonary diseases.

Mist inhalation and bronchodilators are helpful with some patients.

All vaccines should be given for all respiratory diseases, including whooping cough, measles, and influenza (since immune defenses are weakened).



■ EMPHYSEMA

In emphysema, the millions of tiny air sacs (alveoli) become overstretched and rupture. People who are heavy, long-term smokers are the most severely effected. A rare hereditary enzyme deficiency is also a known risk. The smaller breathing passages of the lungs tend to narrow and add to the obstruction. Smoking aggravates spasms in these tubes. As a result, it takes longer for the air to flow into or out of your lungs, and the exchange of oxygen and carbon dioxide in your lungs is slowed. This leads to shortness of breath. Emphysema is difficult to diagnose as breathlessness may occur only during exertion.

SIGNS AND SYMPTOMS

Shortness of breath; chronic mild coughs; weight loss.

DRUG TREATMENT

Antibiotics to treat an infection and possibly a bronchodilator are prescribed. Home oxygen may also be prescribed.

SURGICAL TREATMENT

Some end-stage emphysema patients may require lung transplantation. Some chronic emphysema patients may require a procedure that decreases the space of the lung (wedging of the lung).

HEALTH TIPS

Treatment may not restore your lungs to normal, but therapy can keep the disease from getting worse and can teach you how to use your damaged lungs most efficiently.

Stop smoking.

Avoid exposure to toxic fumes or irritants.

During cold weather, wear a soft scarf or a cold air mask (obtained from a pharmacy) over your mouth to warm the air entering your lungs.

For the same reasons, breathe through your nose to avoid cold air spasms of the bronchial passages.

Patients with emphysema are particularly prone to bronchitis, pneumonia, and other serious respiratory diseases. Avoid people with respiratory infections.

To treat poorly functioning lungs, take the medication prescribed, exercise (low pace) regularly, eg, walking or cycling, and practice breathing techniques prescribed by your physician.



ON THE HORIZON

Research suggests it may be possible to use a one-time in utero injection of gene therapy to prevent lung and intestinal problems in fetuses with cystic fibrosis. A new purified fusion protein vaccine against respiratory syncytial virus (RSV), can protect children with CF against lower respiratory tract illnesses.



■ FUNGAL DISEASES

Yeast and spores of certain fungi, if inhaled, can become established in the lung, causing disease. Most of these cause flu-like symptoms

SIGNS AND SYMPTOMS	No symptoms; or fever, cough, general malaise; enlargement of liver, lymph nodes, spleen; cough and difficulty breathing; low grade fever, chest pains, cough.
TREATMENT	Bed rest and symptomatic treatment of the flu-like symptoms is recommended until the fever disappears.
DRUG TREATMENT	An antifungal that is given through a vein is helpful in most cases.

■ INTERSTITIAL LUNG DISEASE

Interstitial lung disease refers to a large group of diseases that are due to chronic, nonmalignant, and noninfectious diseases of the lower respiratory tract. If the disease progresses, scarring may destroy the lungs. There are over 180 interstitial lung diseases and the causes of all of these are not known. Known causes include the inhaling of toxic or irritating agents (eg, dusts, fumes, aerosols, drugs, radiation, and poisons).

SIGNS AND SYMPTOMS	Fatigue; malaise (body weakness); shortness of breath upon exercising; dry cough; chest discomfort.
TREATMENT	Supportive treatment using oxygen and respiratory lavage may be necessary. Avoiding respiratory irritants is important in the management. Antibiotics may be considered for secondary infections which are proven by culture of the bacteria responsible.



■ LUNG CANCER

Lung cancer is the leading cause of cancer death in the United States in both men and women. The most common cause, in about 87 percent of these cases in the U.S., is tobacco smoking. In the past, lung cancer was more prominent in men but it is now increasing in women and has overtaken breast cancer in cancer-related deaths in women. Lung cancer is found more in industrial areas of the world than in rural areas and may be caused by inhaling irritants that trigger abnormal cells to grow in the lungs. Most primary lung cancers are one of four types: squamous cell carcinoma, adenocarcinoma, large cell carcinoma, and small cell carcinoma. It may spread to the lymph glands in the area of the lung, through the bloodstream, and to other organs. Five to ten percent of lung cancers are detected on routine chest x-rays, prior to any symptoms. If you are between age 50 and 70, and you smoke one pack of cigarettes a day, have an annual chest x-ray and sputum examination for malignant cells.

SIGNS AND SYMPTOMS

None; cough that brings up sputum, sometimes blood-streaked; shortness of breath; chest pain; hoarseness; headache; loss of appetite and weight.

TREATMENT

There are three treatment options for lung cancer:

Surgery for removal of the lung (lobectomy) is the preferred treatment but is only done under certain circumstances. The tumor must be small and in a localized spot; break away cancer cells must not have spread to other parts of the body, and the patient must be in general good health.

Chemotherapy is a treatment of anticancer drugs that relieve and sometimes cause temporary disappearance of symptoms. Since these drugs damage normal cells, they are usually given at intervals to allow for regrowth of normal cells.

Radiation therapy is a beam of radiation focused on the cancer cells at doses that destroy the cancer but do not harm surrounding tissues. A combination of chemotherapy and radiation therapy is a common treatment, however, they both have side effects, eg, diarrhea, nausea and vomiting, hair loss, etc.



■ PNEUMOTHORAX

A pneumothorax occurs when one of the pleural membranes (enfolding both lungs) ruptures. This allows air to enter the space between the membranes and causes the lung to collapse. A pneumothorax may occur spontaneously, due to rupture of a blister containing air on the surface of the lung, or could be the result of an injury, such as a broken rib penetrating the pleural space.

TREATMENT If your lung is less than 20 to 25 percent collapsed, your physician may choose to watch the progress with a series of chest x-rays until the air is completely absorbed and the lung is completely re-expanded.

If collapse of the lung exceeds 25 percent, or if you are short of breath at rest, the air may be drained by a needle or an inserted tube.

■ SARCOIDOSIS

Sarcoidosis involves the immune system and its cause is unknown. One type of white blood cell that protects your body from disease seems to over-respond, causing a buildup of inflammatory cells in the tissue. It is characterized by widespread lesions (areas of changed tissues) that can affect all parts of the body, usually the lung. Sarcoidosis occurs in a higher percentage of blacks in the United States, although all races are affected. Women are affected more often than men and in ages of 20 to 40. In rare cases, it develops in children and elderly people.

SIGNS AND SYMPTOMS Possibly none; malaise (body weakness); fever; shortness of breath, especially with exercise; weight loss.

DRUG TREATMENT If the disease does not resolve, corticosteroids are used and tapered off over months, or even years, as the condition improves.



■ TUBERCULOSIS

Tuberculosis (TB) is a chronic bacterial infection that can develop, after you inhale droplets sprayed into the air, from a cough or sneeze by someone infected with tuberculosis. Although the incidence of this disease has greatly decreased, it continues to be a health problem in the United States, particularly in infants and the elderly. In the United States, more than 95 percent of those acquiring a TB infection have complete healing. In some, tuberculosis can develop within weeks after the initial exposure. More often, the TB organism may lie dormant for years before the disease becomes apparent.

SIGNS AND SYMPTOMS

Initially – none; minor cough; low fever.

Later – fatigue; weight loss; cough, occasionally with blood; slight fever; night sweats.

DRUG TREATMENT

If you have active TB, a combined use of drugs is normally taken. If you have a positive tuberculin skin test, or you recently came in contact with a person with TB, your physician may give you medication to decrease any risk of your contracting the disease.

■ OCCUPATIONAL DISEASES

In all cases, unrelenting exposure may cause signs and symptoms of chronic lung disease with shortness of breath, asthma, malaise, and fatigue. Many of these diseases can be prevented with attention to the occupational risk, avoidance, and use of a protective mask. Depending on the degree of lung damage, some early treatments (with the exception of asbestosis damage), can be reversed with early management. With occupational safety programs, many of these syndromes can be prevented.



ASTHMA

Asthma is a disease of the airways (bronchi and bronchioles) of the lungs. The smallest airways become constricted, inflamed, and congested with mucus. As a result, breathing becomes difficult. A common symptom is wheezing and breathlessness. The symptoms differ greatly in frequency and degree. Some types of asthma do not demonstrate a specific “trigger” and there is no known cause.

HOW THE LUNGS ARE AFFECTED

Airways affected by asthma are primarily the bronchi and bronchioles, which are the air passages that supply the lungs. Normally, the smooth muscle in the bronchiolar wall is relaxed and creates a wide space in the center of the air passage. This allows the air to flow easily and admit oxygen into the body. During an asthma attack, the contracted muscle walls narrow the airway. Narrowing continues with an increase of mucus and inflammation due to chemicals released during an allergic response. Airways that are extremely sensitive are made worse by inflammation and cause a spasm of the bronchial muscle that narrows the airways even more. When inflamed, the mucous glands produce excessive thick mucus, adding to the obstruction. For this reason, maintaining a high fluid intake to help thin the mucus is very important. The condition can become much worse if a bacterial or viral infection occurs during this time.

There are three levels of asthma: mild, moderate, and severe. Severe asthma is the most difficult to treat and can be life-threatening. Of the approximate 500,000 severe asthmatics in the United States, many suffer from other illnesses that may complicate the treatment of the asthma.

ASTHMA IN CHILDREN

Typically, asthma occurs in childhood, but it can appear for the first time at any age. It can also recur after many years of remission. The diagnosis of asthma is challenging and sometimes misdiagnosed. Infants who have asthma often have rapid breathing, “rattly” coughs, and are vulnerable to repeated bouts of pneumonia, bronchitis, or chest colds, which actually disguise the asthma. Not all children who wheeze have asthma but simply have immature narrowed airways that widen as the child grows. While asthma is not diagnosed in many children, some mistakenly diagnosed youngsters outgrow the symptoms and some children’s airways will gradually enlarge during growth with a disappearance of the symptoms. Bronchiolitis is an inflammatory disease seen in young children and is caused by a bacteria or virus. It also is associated with wheezing in children under two years of age and these children may experience asthmatic symptoms until they are seven-plus years of age.



HELP CONTROL YOUR ASTHMA

In the past, treatment was focused on the symptoms of asthma but now is placed more on treating the cause. To accomplish this, the goal is to prevent inflammation and avoid the onset of symptoms. Some identifiable triggers can be managed. Although asthma is not entirely preventable, managing or changing your environment is sometimes necessary.

The following tips could be helpful:

- ◆ Avoid the triggering factor, if you are aware of your allergies.
- ◆ Live and work in an atmosphere that is environmentally filtered, if possible.
- ◆ Immunize against respiratory illnesses, such as the flu, every year BEFORE the infectious season.
- ◆ Stay at home during an outbreak of flu or when outdoor air quality is poor. Weather reports help asthmatics plan their activities.
- ◆ When you become overexerted or exercise in cold weather, wear a mask to help warm the air you inhale.
- ◆ At night, do not eat within two hours of bedtime; take an antacid to neutralize stomach acids; avoid milk products before bedtime; don't allow your pet to sleep in your bedroom (no matter how well you tolerate the pet during the day); and because some hormonal agents that help fight asthma are decreased during sleep, adjust your daytime medication doses to help fight reactions at night.

ASTHMA TRIGGERS

Allergens (foreign substances in the body) are substances that trigger an allergic response. See the following page for the most common asthma triggers.

When asthma is triggered, the allergen causes certain cells lining the airways to release a chemical substance causing inflammation that may last for weeks. In many cases, the asthma patient may suffer from continuous levels of inflammation. These patients are managed with an anti-inflammatory or mediator blocker inhalants to prevent persistent airway inflammation.

There are many other causes in a susceptible person, such as aspirin, some food preservatives and tenderizers, fruit juices, beer, wine, salads, and vegetables.

Occasionally, a woman may experience asthma prior to a menstrual period for reasons that are unknown. Anxiety, stress, emotional and psychological issues do not cause asthma, but they may lead to the severity of an attack.



COMMON TRIGGERS OF ASTHMA ATTACKS



ALLERGIES

Sensitivity to pollens from flowers, grasses, hay, ragweed; mold spores; animal dander; insect parts; certain food and preservatives; and feather or down pillows



AIR POLLUTION

Sensitivity to pollens from flowers, weather inversions, traffic jams, and smoke-filled rooms



HOUSEHOLD PRODUCTS

Vapors from solvents, paints, and bleach; spray poli shes, cleaners, and room deodorants; spray deodorants, perfumes, talcum powder, and cosmetics



EXERCISE

Overexertion, especially in cold weather



DUSTS

Furniture, carpets, and draperies that gather dust; brooms that raise dust; dirty filters on furnaces and air conditioners



INFECTIONS

Colds and other viruses; bronchitis, tonsillitis



ON THE JOB

Dust, fumes, and vapors from wood products; metals, grains, cereals, flour, coffee, tea, papain, cotton, flax hemp



NIGHT TIME

Lying down; tiredness; accumulation of mucus



WEATHER

Changes in seasons; exercising in cold air



SMOKE

Tobacco smoke; wood smoke



ALLERGY-PROOF YOUR HOME

Allergy-proof your home to make a positive difference in your life. Experts rarely recommend moving to a different climate for a solution to your allergies. If you have an allergic reaction to one thing, you will likely be allergic to many things.

Try the following suggestions:

AIR QUALITY

Avoid pollen and airborne mold spores by keeping windows closed and the air conditioning (with a clean filter) turned on in the summer. Maximize air flow inside (and minimize dust and mold) by leaving doors open between rooms. Use a dehumidifier to keep indoor humidity under 50 percent, since dust mites and molds thrive in dampness. Clean the reservoir every day.

CLEANING AND MAINTENANCE

Vacuum and dust frequently, wear a dust mask, and use nonporous vacuum cleaner bags. Keep kitchen and bathroom surfaces dry to avoid mold buildup. In dark, humid areas, use diluted bleach. Fix leaky plumbing and seal any cracks in cement or wooden surfaces to prevent water leakage. Wash blankets and bedspreads weekly, and linens as often as possible. Use a dryer since pollen clings to fabric that is dried outdoors.

DECORATING

Hang washable curtains or shades instead of dust-catching heavy draperies or blinds.

Get rid of whatever upholstered furniture you can, especially in the bedroom. Leave floors bare or use washable area rugs instead of carpets, which are breeding grounds for mold and dust mites. If you have carpets and upholstery, a solution of 3% tannic acid or benzyl benzoate will destroy dust mites. An allergist can tell you where to buy them.

BEDROOMS

Keep your bedroom free of dust and mold collectors like stuffed animals, books, and silk flowers. Use synthetic or foam-rubber pillows and cover mattresses and box springs with mite-proof plastic casings. An allergist can give you a catalog of allergen-proof products. Avoid wool blankets and down or wool comforters (a haven for dust mites). Use washable cotton blankets or synthetic-filled comforters.

PETS

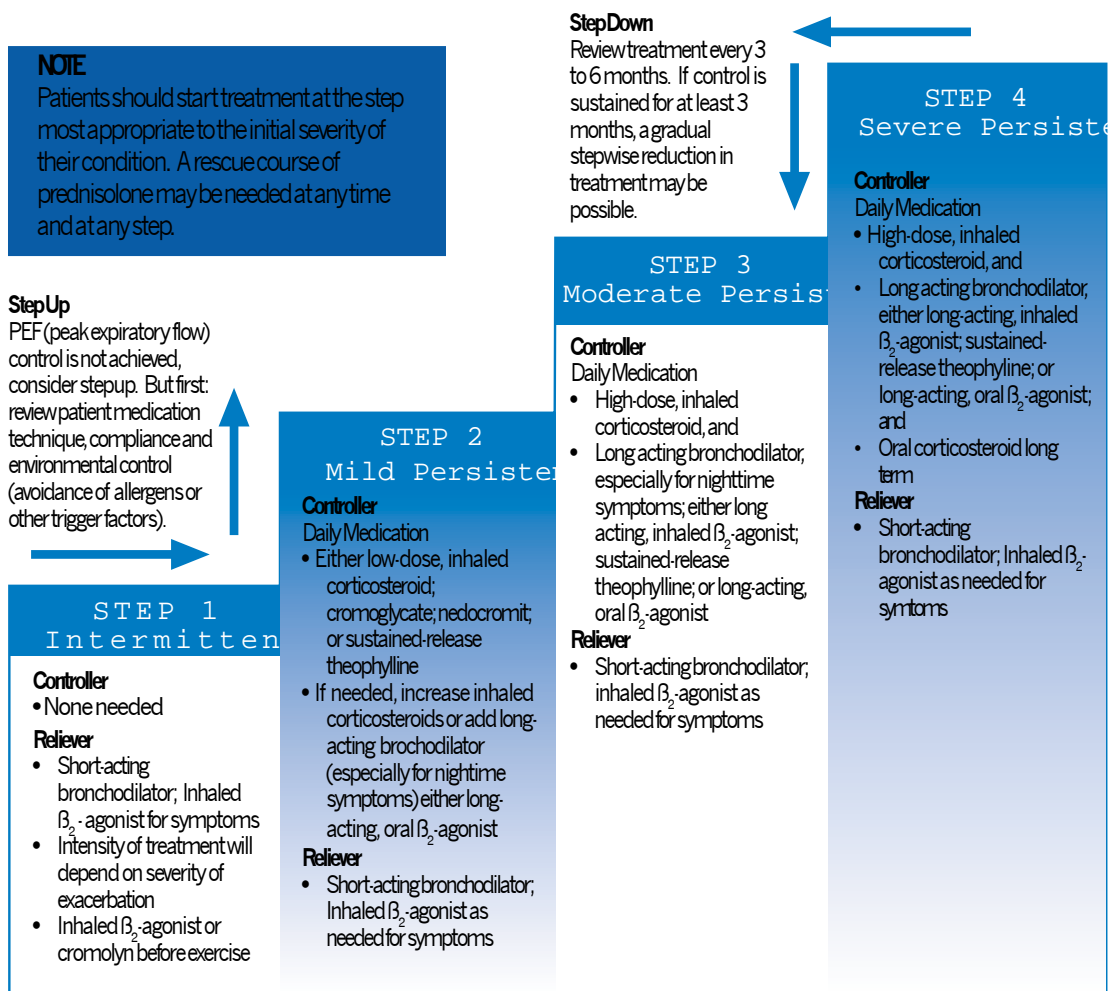
Bathe your pet weekly to cut back on allergens from the animal's body. Plain warm water will do the job; no soap is necessary. Have another household member empty the litter box. Make the bedroom a pet-free zone. Sleeping with a cat or dog is asking for a straight dose of what ails you.



TREATMENT

An understanding of asthma helps both the patient and the doctor to understand and manage the disease. The basis of treatment is to avoid “triggers,” such as allergens. A new approach called “step-care” has recently been recommended.

The goals for “step-care” are to abolish symptoms and allow patients to lead a full and active lifestyle, restore normal lung function, minimize the requirement for “relief” medication, enable normal growth and development in children, and avoid adverse effects of the disease and the treatment used. The basis of care for asthma is the use of clinical guidelines for establishing the diagnosis, severity of the asthma, and then designing a treatment program. This should be designed by the physician and carried out by the patient. This plan reduces the severity of the attacks and the need to continually seek care from an emergency room. New inhalation devices and medications make this possible.



Adapted from *Global Initiative for Asthma: Global Strategy for Asthma Management and Prevention*, 0NHLBI/WHO Workshop Report, NIH/NHLBI Publication 95-3659



DRUG TREATMENT

In emergency situations, patients may use a treatment device called a nebulizer to deliver aerosol medication deep into the lungs. The nebulizer delivers a fine mist that helps relieve congestion and open the airways. Other drugs used to open up the airways are inhalers, tablets, capsules, liquids. Many patients control their asthma with drugs delivered in metered-dosed inhalers rather than tablets or injections.

Bronchodilator These drugs work by affecting the nerve signals that control the contraction and relaxation of bronchiolar muscles. They do not reduce inflammation. The short acting type is used to open the airways during an acute episode. They are also called “rescue drugs.” The device used is an inhaler, but the drug does come in oral form. The preventative type is a long-acting inhaled beta-agonist that is used to prevent attacks and help prevent the onset of symptoms.

Corticosteroids This class of anti-inflammatory drugs is the primary tool in preventing, reversing, and controlling inflammation. Steroids help reduce swelling and open the airway and are often used with other drugs to enhance their effectiveness. Steroids come in tablets, inhalers, liquids for injection, or emergency intravenous use. Oral steroids are usually given on a short term basis because they have significant side effects. Steroids are used when other medications are not effective. Neither inhaled nor oral steroids provide immediate relief from an asthma attack, but they do manage the condition over time. Steroids may take up to four weeks before the body responds. Often, inhaled steroids are used with an inhaled bronchodilator, that provides faster relief from an asthma attack.

Cromolyn Sodium and Nedocromil These are used as a preventive treatment rather than treatment for acute attacks. They are available in capsules and in aerosol (delivered by a metered-dose inhaler) and a liquid (delivered by a nebulizer).

Xanthine Derivatives The most common xanthine drug is Theophylline. These stimulate the nervous system, such as promoting urine release and relieving headaches. Caffeine containing compounds enhance its effectiveness (tea, coffee, chocolate, and colas). Viral illnesses and type 2 histamine antagonists (eg, anti-heart-burn medications) limit its effectiveness.

Long-acting Bronchodilator The long-acting beta agonist, Salmeterol, is available for preventing asthma attacks. Salmeterol has a slower onset of action, but it lasts for 12 hours. In addition, this drug has a benefit for exercise-induced asthma if taken before exercising. This drug does not have an anti-inflammatory nor should it be expected to give immediate bronchial relief and reverse acute problems.



HOME REMEDY

Although over the counter drugs might temporarily relieve symptoms, they do have side effects that may outweigh the advantages.

Antihistamines (for allergies that cause asthma) Causes drowsiness, dries out mucous membranes, and aggravates depression. Not recommended.

Oral Decongestants (for nasal stuffiness) May raise blood pressure. Risky with asthma medications.

Nasal Decongestants (for nasal stuffiness) May cause "rebound effect." Overuse worsens symptoms. Use only for nasal stuffiness.



Theophylline, Atrovent (for wheezing, asthma) Side effects may be dangerous with a risk of glaucoma or blood pressure changes.

CONCLUSIONS

Over the counter medication for asthma has more risk than effect. The most effective and safe treatment is prescribed and directed by your physician.



WHAT TO DO

SEVERITY LEVEL	SYMPTOM	POSSIBLE DIAGNOSIS
 <p>Seek Medical Help Immediately!</p>	Productive cough, shortness of breath with exercise, wheezing	Cor Pulmonale
	Malaise (body weakness), headache, fever and shaking chills, cough that produces mucus, shortness of breath, chest pain	Legionnaire's disease
 <p>Make an appointment to see your doctor</p>	Wheezing, exhaling heavily, rapid breath, rapid heart rate, productive cough	Bronchiolitis
	Deep, productive cough, chills, fatigue, slight fever, soreness and feeling of a tight chest	Acute bronchitis
	Cough with possible blood, pain in chest, chills, high fever	Pneumonia
	Dry cough, fever and night sweats, weight loss, shortness of breath, chest pain on deep breathing	Empyema
	Shortness of breath, chest pain, dry cough, fever and chills	Pleurisy/pleural effusion
	Chronic cough producing mucus, shortness of breath	Chronic bronchitis
	Shortness of breath, chronic cough	Emphysema
	(In children) Shortness of breath, chronic cough, tightness in chest, wheezing, exercise intolerance, weight loss, poor appetite, fatigue, chronic diarrhea and malnutrition	Cystic fibrosis
	Body weakness, fever, shortness of breath, weight loss	Sarcoidosis
	Shortness of breath, fever, decreased blood pressure, rapid heart rate, severe cough	Atelectasis
Productive cough with occasional blood, shortness of breath, chest pain, hoarseness, headache, loss of appetite and weight	Lung cancer	



Make an appointment to see your doctor

Fever, fatigue, weight loss, night sweats, occasional blood with coughing

Tuberculosis

Fever, cough, fatigue, enlarged liver, lymph nodes, spleen, cough, difficulty breathing

Fungal infection



Try the home treatment outlined in this chapter

Cough, sore and achy feeling, fever, chills, body weakness and fatigue

Cold or flu