

Asthma Today



ATS 2017

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Asthma affects more than 24 million people in the United States, both children (about 6 million) and adults (18 million), according to the latest data from the U.S. Centers for Disease Control and Prevention (CDC). Between 2001 and 2011, the number of people with asthma in the United States increased by 28 percent.

The government estimates that asthma costs the U.S. economy \$56 billion each year in medical bills, lost school and workdays, and premature deaths. Nearly three in five people with asthma say it interferes with their daily lives, causing them to limit their activities.

There is currently no cure for asthma, but it can be controlled with medicine and lifestyle changes. You should work with your health care provider to develop a personalized asthma management plan. Tell your health care provider about your symptoms and how they affect your life, as well as what triggers your asthma. Triggers are those things that lead to asthma symptoms and make your asthma worse.

Asthma by the numbers

8.9 million

asthma-related doctor visits annually



1.9 million

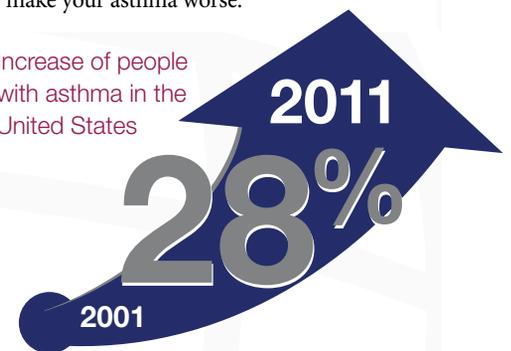
asthma-related emergency department visits annually



479,000

asthma-related hospitalizations annually

Increase of people with asthma in the United States



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What is Asthma?

Asthma is a chronic lung disease that causes the breathing tubes (airways) that carry air in and out of your lungs to become inflamed (swollen) and filled with mucus, making it difficult to breathe. The most common symptoms of asthma are coughing, shortness of breath, chest tightness, and wheezing (a whistling sound in the chest). An asthma attack can be mild, moderate, or serious—even life-threatening. The disease often starts in childhood, but some people develop asthma as adults.

Asthma is a disease that may have a variety of underlying causes, including allergies, viral or respiratory infections in infancy, and/or a family history of asthma. A person is 30 percent more likely to have asthma if one parent has it. That number jumps to 70 percent if both parents have asthma. Allergies, which can trigger asthma, may also be inherited (run in the family). Air pollution or tobacco smoke exposure increases the risk of developing asthma and can trigger asthma symptoms.

Asthma researchers and clinicians are working to learn more about how those different causes affect individual patients. With knowledge gained from their work, they are developing targeted therapies to personalize asthma care based on the underlying cause.

Each year, the American Thoracic Society (ATS) International Conference presents the latest findings from asthma research conducted around the world. Asthma Today, part of the ATS Patient Information Series, shares this research as we continue to expand our knowledge of this common, yet complex, disease.

What Triggers Asthma?

Irritants are substances, conditions, or things that can cause the airways in your lungs to become inflamed and swollen. Irritants can trigger symptoms in anyone with asthma. Allergies vary from person to person and can trigger symptoms in those who are sensitized (susceptible to allergies).

For some people, certain medicines can

trigger or worsen asthma. These medicines include non-prescription medications, such as aspirin and ibuprofen (known as a non-steroidal anti-inflammatory drug—NSAID), and prescription medications, such as beta blockers. Sulfites found in certain foods and drinks, including wine, also may trigger asthma issues in some people.

Common Triggers

- Air pollution
- Cigarette smoke
- Allergies to animals with fur or feathers, cockroaches, dust mites, molds, and pollens
- Viral and respiratory infections
- Cold air
- Exercise
- Stress



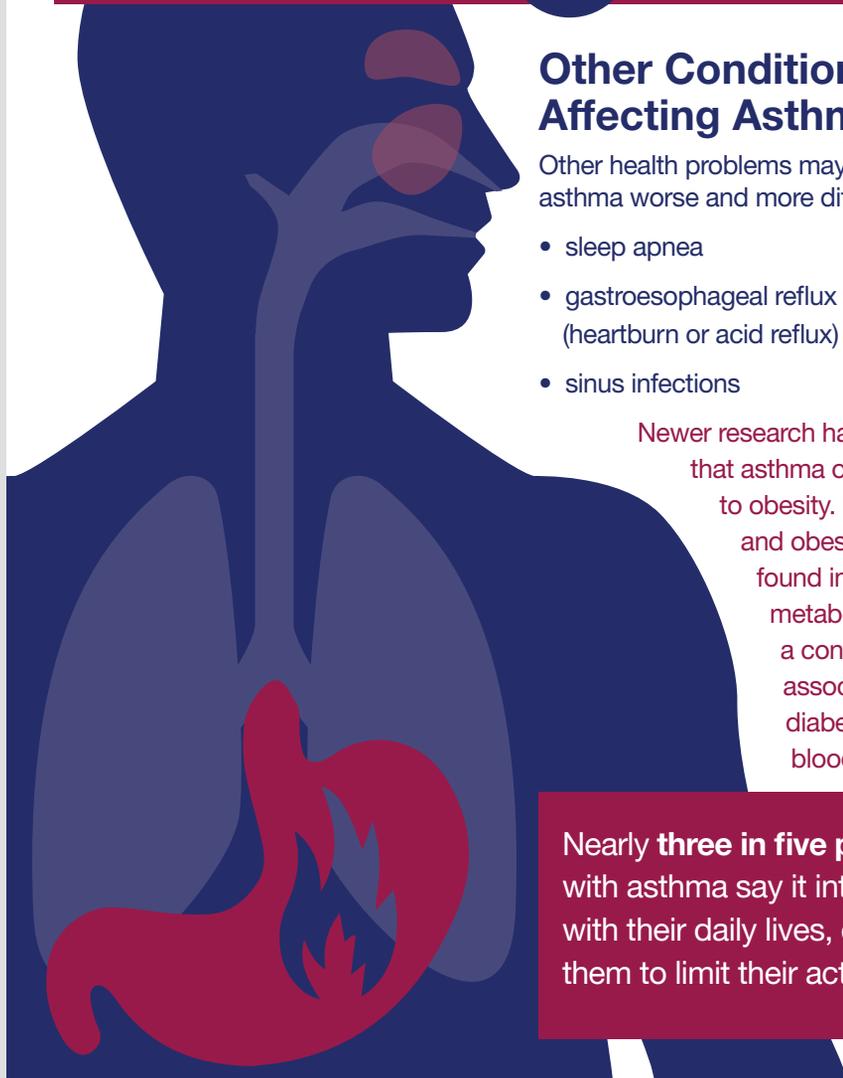
Other Conditions Affecting Asthma

Other health problems may make your asthma worse and more difficult to control:

- sleep apnea
- gastroesophageal reflux (heartburn or acid reflux)
- sinus infections

Newer research has found that asthma often is tied to obesity. Both asthma and obesity are often found in people with metabolic syndrome, a condition also associated with diabetes and high blood pressure.

Nearly **three in five** people with asthma say it interferes with their daily lives, causing them to limit their activities.



Asthma Diagnosis

There is no single test to diagnose asthma. A diagnosis requires the health care provider to collect information from a thorough patient and family history, a physical exam, and lung function testing, also known as breathing tests. While gathering the medical history, your provider will ask about recent illnesses or triggers that might relate to the start of asthma symptoms.

If you are being diagnosed as an adult, your health care provider will want to rule out other lung diseases, including COPD (chronic obstructive pulmonary disease). COPD is a lung disease that resembles asthma. COPD is usually not diagnosed until age 40 or later. You can learn more about COPD by reading the ATS Patient information series fact sheet on COPD at thoracic.org/patients/patient-resources/resources/copd-intro.pdf.

There is no single test for diagnosing asthma, but the most common method of testing for asthma is a lung function test called spirometry. This test measures the amount and speed (flow) of air that you can inhale and exhale. Most children 6 years and older and adults can do this test, and it may be done before and after inhaling a bronchodilator,

a type of medicine that opens the breathing passages. Lung function tests also are used to help assess asthma control over time. You can learn more by reading the ATS Patient Information Series fact sheet Pulmonary Function Tests at thoracic.org/patients/patient-resources/resources/pulmonary-function-tests.pdf

Many children who develop asthma generally show their first symptoms before age 5. Children under age 5 may have difficulty completing lung function tests. Health care providers rely on the child's signs and symptoms of asthma, such as wheezing, allergic reactions to allergens, and response to medication, as well as the child's medical history and physical exam, to diagnose asthma. You can learn more by reading the

It is important to tell your health care provider about:

- Excessive coughing, especially at night
- Wheezing
- Chest tightness
- Shortness of breath or breathing symptoms during or after exercise or physical activity

ATS Patient Information Series fact sheet Pulmonary Function Testing in Children thoracic.org/patients/patient-resources/resources/pulmonary-function-testing-children.pdf.



Asthma Tests

Spirometry is the most common lung function test used in making the diagnosis of asthma as well as monitoring asthma control. Your health care provider also may use these other tests to better understand your condition and triggers.

Allergy testing:

Skin tests and blood tests can be used to determine if you or your child are allergic to animals, cockroaches, dust mites, molds, and pollens, all of which can be asthma triggers.

Eosinophil levels:

Eosinophils are a type of white blood cell. Elevated eosinophil levels can take part in an inflammatory response, and high levels are a marker of allergy. Eosinophils can be measured in your blood or from the mucus you bring up when you cough.

Exercise challenge:

If your airways narrow with physical activity, you may have exercise-induced asthma. This test is done using a treadmill or stationary bicycle with lung-function testing.

Exhaled nitric oxide test:

When your airways are inflamed, your breath may have high levels of the gas nitric oxide. This may indicate that you have asthma. In this test, you exhale into a device that measures the nitric oxide level in your breath.

Methacholine challenge:

If your airways narrow after inhaling methacholine, you most likely have asthma. You can learn more by reading the ATS Patient Information Series fact sheet, Lung Function Studies: Methacholine Challenge Test at goo.gl/EMbuZa

Peak flow:

Peak flow measures how hard you can breathe out. If your asthma is not controlled, you cannot breathe air out as hard and fast and your peak flow will be lower than normal. Some people also use a peak flow meter at home to track asthma control.

Asthma Treatment

Currently, there is no cure for asthma, but it can be managed so you or your child can lead an active life. In addition to faithfully taking your medicines, here are three things you can do to manage the disease:



- 1 Work with your health care provider** to develop a written, personalized asthma action plan.
- 2 Work with your health care provider** to treat other conditions that can interfere with asthma management. These could include acid reflux, sleep apnea, and sinusitis.
- 3 Avoid asthma triggers.** If physical activity is a trigger for you, talk with your health care provider about how to stay active because physical activity is an important part of a healthy lifestyle. Talk with your health care provider about asthma medicines that will allow you to stay active.

There are two main types of asthma drugs: maintenance (daily control) and quick-relief.

Maintenance (daily control)

Maintenance medications do not provide immediate relief but are used daily help you control your asthma symptoms. These daily control medicines can include inhaled corticosteroids, long-acting beta agonists, leukotriene modifiers, and monoclonal antibodies. Long-acting beta agonists are only recommended for use in combination with inhaled corticosteroids. Occasionally, a long-acting anticholinergic medicine or theophylline is also added to help control asthma.

Monoclonal antibodies are intended to treat patients with moderate to severe asthma

Your asthma action plan should include:

- Your name
- Emergency contact information
- Contact information for your health care provider
- A list of triggers that may cause an asthma attack

- A list of your medicines, including ones used every day and those used for a change in symptoms
- You can download a PDF of an action plan from the U.S. National Institutes of Health at www.nhlbi.nih.gov/files/docs/public/lung/asthma_actplan.pdf.

who are not helped by inhaled corticosteroids and other asthma medications. These biologic medicines act to block allergic and inflammatory reactions in the body. Monoclonal antibodies have recently been the subject of more research and some of these biologic medicines for asthma have been approved by the Food and Drug Administration.

Quick-relief

In contrast to maintenance medicines, quick-relief medications, also known as rescue medications, are typically used during an asthma attack or at the onset of more severe asthma symptoms. They can quickly relax the muscles, opening your airways.

It is important to follow your health care provider's instructions when taking your medicine, including how to properly use inhalers and nebulizers. Years of research have shown that the most efficient way to take asthma medicines is to inhale them into your airways and lungs. This is done using one of two devices, an inhaler or a nebulizer.

Inhalers are used most often because they are small and easy to carry. There are many different types of inhalers, so ask your health care provider which one is best for you. You can ask your health care provider or pharmacist to show you the best way to use each of your inhalers.

One commonly used device is a metered dose inhaler (MDI), which releases a fixed amount of medicine. You can learn more about MDIs by reading the ATS Patient Information Series fact sheet, *Using Your Metered Dose Inhaler (MDI)* at thoracic.org/patients/patient-resources/resources/metered-dose-inhaler-mdi.pdf.

Another way to take an inhaled medication is to use a nebulizer. A nebulizer converts liquid medicine into a fine mist you inhale by breathing through a mouthpiece or a mask. A nebulizer is particularly effective for people who are experiencing severe breathing problems or having problems using an MDI device. There are different types of nebulizers, so ask your health care provider which is best for you.



New Asthma Research

The latest research about asthma presented at the 2017 ATS International Conference focused on many different aspects of the disease. Here are a few summaries of that research.

Respiratory viral infections in infants have been shown to increase the risk of children developing asthma later in life. Among these are respiratory syncytial virus (RSV) and human rhinovirus (HRV). These are two of the most common viruses involved in colds and respiratory infections. Preventing these infections in infancy may prevent respiratory problems later in life. Lower respiratory tract infections are associated with an increased risk of asthma and with 80 percent of childhood asthma attacks.

RSV has been shown to double the risk of developing asthma. Preventing RSV infections in infants might prevent wheezing, and possibly asthma, later in childhood. This risk is linked to an infant's age during the RSV season, which is during the winter months. Infants who are 4 months old at the peak of the RSV season have the highest risk of developing asthma. RSV infection is also associated with wheezing in infants. You can learn more about RSV by reading the ATS Patient Information Series fact sheet, What Is Respiratory Syncytial

Virus (RSV)? at thoracic.org/patients/patient-resources/resources/respiratory-syncytial-virus-rsv.pdf.

HRV-induced wheezing illnesses in early life can lead to a significant risk of developing asthma. HRV infections are the most common triggers of acute asthma attacks. Exposure to everyday allergens early in a child's life could help prevent the development of asthma later in life, according to some asthma researchers. Other researchers say there is no evidence that exposure to allergens—such as pollen or animals with fur or feathers—has such a positive effect. What both sides do agree on is that it's impossible to completely block a child's exposure to everyday allergens and that the research into the effect of early exposure to allergens is inconclusive.

Biological markers (biomarkers) are substances in the body that can be measured to indicate the presence of a disease. Those biomarkers also can be studied to develop treatments for the disease. Several biomarkers for asthma are being investigated, but none have been identified. A better understanding of these markers could help researchers develop a test to diagnose asthma and targeted therapies for asthma.

Is a single treatment better than a combination treatment for asthma? One study showed that a combination of treatments is more effective. Patients with moderate-to-severe asthma had a lower risk of asthma attacks when they used an inhaled corticosteroid plus a long-acting beta agonist when compared with patients who used only an inhaled corticosteroid, according to the study.

Asthma Week at ATS

To learn more about the latest advances in asthma research and treatments, check out Lung Disease Week at the ATS, at thoracic.org/patients/lung-disease-week, and access ATS patient resources on the ATS website at thoracic.org/patients/patient-resources/topic-specific/asthma.php. The website includes links to asthma information from ATS publications, the ATS International Conference, and ATS educational sessions.

The ATS produces a Patient Information Series and a Public Health Information Series that include more than 100 fact sheets on topics in pulmonary, critical care, and sleep medicine. These topics include pulmonary function testing in children, flexible bronchoscopy, mechanical ventilation in sleep studies, smoking cessation, stem-cell therapy, and pulmonary rehabilitation.

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