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NIH News in Health

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Keep Your Lungs Healthy

Defend Against Chronic Lung Diseases

With each breath in, your lungs take in life-giving oxygen. The oxygen then travels through your blood to every cell in your body. With each breath out, your lungs release carbon dioxide, the waste produced when your cells burn energy. If something goes wrong with your breathing, it can impact your whole body and your daily life.

Many different symptoms can signal a lung problem. You may have coughing, wheezing, or shortness of breath. Your chest can feel tight, like someone is squeezing or sitting on it. You may find it hard to take a deep breath. You might become short of breath easily or feel tired all the time.

Sometimes these symptoms are temporary. They can be caused by things like stress, allergies, or infections. But if you have lung symptoms that last for more than a few weeks, it's important to talk to your doctor. These symptoms could indicate a chronic lung disease.

Your risk for chronic lung diseases may be higher if you inherit certain genes from your parents. But many people who develop a chronic lung disease have no genetic risk factors. Exposure to certain environmental factors, like cigarette smoke, dust, and pollution, can also increase your risk.

The good news is that you can take steps to help prevent many chronic lung diseases. If they do develop, catching them and starting treatment early can improve your quality of life. Researchers are also testing better ways to identify and treat these conditions.

Blocked Air Flow • The most common types of chronic lung problems are called obstructive lung diseases. Asthma and chronic obstructive pulmonary disease (COPD) are the most common of these.

In obstructive lung diseases, "air flow is the problem," explains Dr. Andrew Lipton, medical director of the lung function lab at NIH. "It's hard for air to come into or go out of the lungs."

In asthma, swelling in the lungs makes the airways narrower than normal. They also become very sensitive to things like dust and pollen. Asthma most often develops in childhood.

Asthma can impact your day-to-day life. An asthma attack can make it hard to breathe for hours or days. An attack can even lead to a trip to the hospital and can sometimes be fatal.

But "if you take your medications [as prescribed]," says Dr. Kathryn Blake, an asthma researcher at Nemours Children's Health, "most people can be virtually symptom-free."

Managing symptoms can help kids and adults do the things they love, like sports, she adds. But many teens and young adults with asthma don't use their medications correctly. Confusion about when to take medications can play a role, Blake says. Or teens may forget when they are busy. Other factors like peer pressure can add difficulty.

"Teenagers don't want to be seen as being different," she says. "They don't want to stand out. They would rather limit their activities than take out and use their inhaler."

Blake and her team are testing whether regular video chats with a pharmacist can help teens take their asthma medications more regularly.

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"It's kind of like having a tutor," she says. "It's just someone there to help you along and figure out what issues are impeding your care." Some kids will grow out of asthma, Blake says. But many don't. If you don't treat your asthma, the symptoms are likely to get worse over time.

In COPD, the tubes that carry air in and out of the lungs become partly blocked. Smoking is the main risk factor for the disease. But about 1 out of every 4 people who develop COPD has never smoked.

COPD gets worse with time. But treatments can slow its progression and make you feel better. Medications can help some people breathe more easily. Others may benefit from oxygen therapy or rehabilitation programs. NIH-funded researchers are studying whether treating COPD earlier can help people live longer. They're also working on new drugs that may stop COPD from getting worse.

Restricted Breathing • Another group of lung diseases are called interstitial lung diseases. In these diseases, lung tissue may become inflamed or stiff, or scarred by damage. This prevents your lungs from fully expanding when you breathe. "These things all reduce the volume of the lungs," explains Lipton.

Treating interstitial lung diseases can be tricky, because the cause can't always be found, explains Dr. Kevin Flaherty, a pulmonary disease expert at the University of Michigan. "But if we can find the cause, then we can target it," he says. For example, treating another disease that is causing scarring in the lungs may help.

Unfortunately, the cause of a common interstitial lung disease, called idiopathic pulmonary fibrosis or IPF, isn't known. People over age 50, men, and those who smoke are more likely to get it. Some people live for years with the disease. But for others, the condition quickly worsens. Drugs are available that can slow lung scarring over time. But researchers are searching for better treatments.

More than a decade ago, an NIH-funded study found that suppressing the immune system didn't help people with IPF. The study also tested an antioxidant used to treat certain lung diseases. But it also did not appear to have any benefit.

Recently, researchers looked at biological samples from the patients in that study. They found genetic differences between the patients that may have affected whether the treatment worked. Patients with a certain genetic change seem to have benefited from the treatment. Those without that genetic change showed no benefit or harmful effects from the treatment.

NIH is now funding a clinical trial to see if patients with certain genetic factors can benefit from the antioxidant treatment. If it works, this would be the first personalized treatment for IPF, Flaherty explains.

For now, there are many things you can do to lower your risk of developing a chronic lung disease. See the Wise Choices box for tips to keep your lungs as healthy as possible.

If you have lung symptoms, talk to your doctor. Many tests for chronic lung diseases are simple. Some can even be done at your regular doctor's office. Treating these diseases early can help you stay healthier for longer. ■

Wise Choices

Protect Your Lung Health

- **Quit smoking, or don't start.** Get free help at smokefree.gov, 1-800-QUIT-NOW (1-800-784-8669), or text QUIT to 47848.
- **Avoid secondhand tobacco smoke.** Stay away from places where smoking is allowed. Ask any friends and family members who smoke to do it outside.
- **Be physically active.** Physical activity can help strengthen your heart and lungs so they work better. Talk to your doctor about what level of physical activity is right for you.
- **Limit exposure to air pollution.** Check the Air Quality Index (airnow.gov) before outdoor activities. Make sure your home is aired out and cleaned regularly.
- **Stay up to date on vaccines** against diseases that harm the lungs. These can include flu, COVID-19, and pneumonia.
- **Use protective gear** if your work exposes you to dust, silica, allergens, chemical fumes, or other pollution sources.
- **Make good sleep a priority.** Poor sleep can cause lung disease symptoms to worsen. Sleep is also critical to overall health.

Web Links

For more about chronic lung diseases, see "Find More Information" in the online article: newsinhealth.nih.gov/2025/08/keep-your-lungs-healthy

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Discovering VEXAS

Insights Into a New Disease

Scientists recently discovered a new disease, called VEXAS, which can appear suddenly in midlife. It's characterized by repeated attacks of **inflammation**, often without a clear cause. The inflammation, researchers found, is caused by the body's disease defense system, or immune system, attacking its own cells. Studies are now uncovering what leads to the onset of this newly discovered disease.

People with VEXAS can have different symptoms. Some get fevers, rashes, or fatigue. Others may have inflammation of different organs. VEXAS often affects the blood and bone marrow. It can also affect the lungs and cause coughing and shortness of breath. (See the Wise Choices box for more symptoms.)

Scientists recently discovered that VEXAS is caused by mutations, or changes, to a gene called *UBA1* in blood cells. This gene is located on the X chromosome. Women have two X chromosomes, whereas men only have one. That means women have two copies of the gene, but men only have one. In men, mutations to their only copy of the gene can be enough to get the disease. But in women, mutations would have to occur in both copies. So VEXAS typically affects men.

The *UBA1* gene has instructions for the body to make a protein called the ubiquitin-activating enzyme 1, or E1 enzyme. This enzyme identifies and marks damaged or unneeded proteins so they can be removed from the body. Mutations to the *UBA1* gene can make the E1 enzyme stop working properly. This leads to the buildup of damaged or unneeded proteins inside cells. The buildup of defective proteins appears to activate the body's disease defense system, leading to inflammation.

The genetic mutations that cause VEXAS aren't inherited from your parents. Instead, they're acquired during your life. Genes can become mutated when your DNA is being copied to make new cells. Exposure to certain types of radiation or chemicals can also cause mutations.

"Part of normal aging is that all our cells develop mutations," explains Dr. David Beck, a geneticist at New York University who was on the team that first discovered VEXAS. "It's just normal wear and tear on our cells as we get older."

Most mutations don't have any health consequences. But a mutation in the *UBA1* gene does. Beck and his team estimated that about 1 in 13,600 people have mutations that can cause VEXAS. Among people older than 50, the prevalence is 1 in 8,000. For men over 50, it's almost 1 in 4,000. Because the symptoms are so variable, the best way to know if you have VEXAS is through genetic testing for mutations in *UBA1*.

Since VEXAS was only recently identified, researchers are still figuring out the best ways to treat it. Steroids or other drugs that stop the body's immune system response can calm inflammation. Drugs that treat certain blood cancers are being tested for treating the effects of VEXAS on blood and bone marrow.

NIH is currently recruiting participants for a clinical trial to see if bone marrow transplants can treat VEXAS syndrome. Find out more at clinicaltrials.gov/study/NCT05027945.

"We're still learning about this disease," Beck says. "It's only been recognized for the last few years. So a lot more work needs to be done." ■

Wise Choices

Symptoms of VEXAS

- Recurring skin rashes, which may be painful.
- Pain, swelling, and redness of the ears and nose.
- Lung inflammation, including cough and shortness of breath.
- Inflammation of blood vessels and blood clots.
- Fevers.
- Extreme fatigue.
- Low red blood cell count or low hemoglobin (anemia).
- Low platelet levels. Platelets are tiny pieces of cells that clump together to form blood clots.
- Low white blood cell counts.
- Abnormal findings on bone marrow biopsy.

Definitions

Inflammation
The heat, swelling and redness caused by the body's protective response to injury or infection.

Web Links

For more about VEXAS and other inflammatory diseases, see "Find More Information" in the online article: newsinhealth.nih.gov/2025/08/discovering-vexas

Health Capsules

For links to more information, please visit our website and see these stories online.

Home Test Kits Boost Screening for Cervical Cancer

Cervical cancer can be easy to miss. It usually has no symptoms. But you can have a screening test for the virus that causes nearly all cases of cervical cancer. The tests detect human papilloma virus, or HPV. Early diagnosis and treatment can prevent cervical cancer and related deaths.

Unfortunately, many women have never been screened or are behind in their screening. NIH-supported scientists tested to see if screening rates could be improved by at-home collection of samples. The study enrolled nearly 2,500 participants who were overdue for a screening.

One group received a phone call inviting them to get screened for cervical cancer at a clinic. Another group received a similar call, but were also sent kits to collect their own samples at home. The women could then mail them in for testing. The third group received a call, a kit, and a follow-up call to encourage them to return the kit.

More than 40% of those who received the at-home kits completed screening for cervical cancer. They were more than twice as likely to get screened as those who got only a phone reminder. The screening rate was even higher for those who received the mail-in kit and a follow-up call. The findings hint that ready access to at-home kits could reduce obstacles to screening for this often preventable cancer.

"These results show that self-collection testing could be a solution to increasing access to screening," says study lead Dr. Jane Montealegre of the University of Texas MD Anderson Cancer Center. "This, in turn, could reduce the burden of cervical cancer in the U.S." ■

What Are Omega-3s?

Your body needs omega-3 fatty acids, sometimes called "omega-3s," to stay healthy. These help to build brain cells and keep your heart and other organs in good working order.

Your body can't make omega-3s itself. They come from the foods you eat or dietary supplements.

Fatty fish, like salmon and tuna, are rich in types of omega-3s called DHA and EPA. These healthy fats are also found in shellfish, such as crabs or oysters. A different type of omega-3, called ALA, is found in certain vegetable oils, like canola or soy oils. Flaxseeds, chia seeds, pumpkin seeds, and walnuts also contain a lot of ALA omega-3.

You can find dietary supplements that contain different types of omega-3. But most experts agree that the best way to get benefits from omega-3s is from the foods you eat. The health benefits of omega-3 dietary supplements are unclear.

If you're thinking about taking omega-3 supplements, talk to your health care provider. That's especially important if you take medicine that affects blood clotting or are pregnant or breastfeeding. Also check with your provider if you are allergic to seafood or considering giving omega-3 supplements to a child.

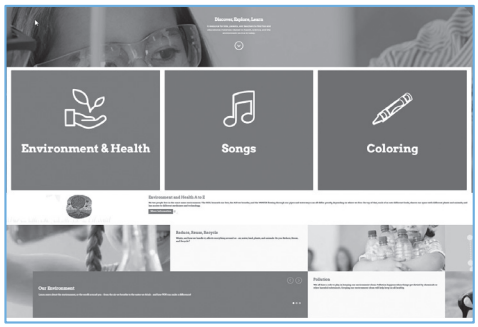
Learn more at go.nih.gov/NIHNiHAug25Omega3. ■

Featured Website

Kids Environment, Kids Health

kids.niehs.nih.gov

Have fun learning about health, science, and the world we live in. Kids, parents, and teachers can find engaging and educational information at this NIH website. Solve puzzles, play games, and learn about the environment we all share. See how you can make a difference.



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