

NIH News in Health

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Breathe Easier Dealing with Bad Air Quality

Even though you can't see it, the air you breathe can affect your health. Polluted air can cause difficulty breathing, flare-ups of allergy or **asthma**, and other lung problems. Long-term exposure to air pollution can raise the risk of other diseases, including heart disease and cancer.

Some people think of air pollution as something that's found mainly outside. They may picture cars idling or power plants with smoke stacks. But air pollution can also occur inside—in homes, offices, or even schools.

Whether outdoors or indoors, the effects of air pollution are most obvious for those who already have difficulty breathing. "All people are likely susceptible to the adverse effects of air pollution. But people who have chronic lung diseases such as asthma are more susceptible," explains Dr. Nadia Hansel, who studies lung problems at Johns Hopkins University.

NIH researchers are working to



expert at NIH. "As a result, air passages narrow, which makes it much harder to breathe."

Another type of outdoor pollutant that affects health is particulates. These are fine and coarse particles that are released when fuel is burned. They can come from things like cars, power plants, and wildfires. Research has linked particulates to short- and long-term lung problems.

To track these and other harmful pollutants, air quality

monitors have been set up at over 1,000 locations across the country. The U.S. Environmental Protection Agency uses these monitors to produce the Air Quality Index (AQI). The index can be found online at www.airnow.gov.

People who are sensitive to outdoor pollution may want to use the AQI to track when levels are high. This information can help you make choices about when to do outdoor activities.

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understand and reduce the impact that air pollution—both outdoors and indoors—has on health.

What's Outside • Several different types of pollutants can affect your health. When the weather is warm, an invisible gas called ozone can make it harder for some people to breathe. This gas is created when sunlight triggers a chemical reaction between oxygen and certain pollutants from cars, factories, and other sources.

Ozone can irritate the lining of your airways and lungs. People with asthma and other lung conditions are more likely to feel its effects.

"When people with poorly controlled asthma are exposed to low levels of ozone, the amount of **inflammation** in the lungs goes way up," explains Dr. Daryl Zeldin, a lung and environmental health science

Definitions

Asthma

A chronic lung disease that causes wheezing, coughing, chest tightness and trouble breathing.

Inflammation

Swelling, redness, or irritation caused by the body's protective response to injury or infection.

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Improving Air Indoors • Indoor air pollution can be harmful, too. It can come from many sources. Secondhand tobacco smoke contains tiny particles that can hurt your lungs. Gas stoves and appliances can create harmful gases.

Pets and pests (such as mice and cockroaches) can shed substances, called allergens, that cause allergies. Mold and dust mites also produce allergens. Even furniture and cleaning products can release harmful compounds into the air.

In recent years, researchers have learned a lot about how exposure to indoor pollutants contribute to disease. “Studies are now asking: What do we do about it? What sorts of things can help reduce some of these exposures?” Zeldin says.

Several NIH-funded researchers are looking at ways to reduce harm from indoor air pollution. Hansel studies the use of air cleaners (also called air purifiers) to improve the air quality for older adults with chronic obstructive pulmonary disease (COPD). This condition makes it hard to breathe and puts people at increased risk of dangerous lung infections, such as pneumonia.

“Studies have shown that high pollutant levels inside the home can make breathing harder for people with COPD,” Hansel says.

Hansel’s team is now testing whether using air cleaners with special filters in the home can decrease COPD symptoms. The filters they’re testing remove both particulates and nitrogen dioxide, a gas pollutant produced by cooking.

The researchers will compare COPD symptoms in people who use the filters with those who don’t. They hope the use of the filters will also reduce hospital visits.

Research has shown that improving indoor air quality in the home can improve the health of kids with lung conditions, explains Dr. Wanda Phipatanakul, a children’s health expert at Boston Children’s Hospital.

But while air quality in the home matters, children can spend more than eight hours a day indoors at school. Improving air quality in schools has the potential to improve the health of many children at once, Phipatanakul adds.

“Home-based interventions help individual families, but targeting schools could help all the kids that are there, and has much more potential for impact,” she says.

Phipatanakul is running an NIH-funded study in about 40 schools. The intervention includes air cleaners in classrooms to remove particles and special pest control strategies to reduce allergens. The researchers are tracking children with asthma at the schools over the school year to see if the intervention improves their symptoms.

Research has shown that, in addition to improving health, improving indoor air quality can also boost how well kids do in school. “Kids who come to school and aren’t as sick are going to do better. So that’s kind of the overall goal,” Phipatanakul says.



Wise Choices Tips to Breathe Easier

To reduce the effects of poor quality air on your health:

- **Avoid outdoor activities in the afternoons on warm days**, when the risk of air pollution is highest.
- **Avoid strenuous outdoor activities if the air is polluted.** Check your region’s air quality index. Orange and red mean it’s a bad air day, so people with lung problems should avoid the outdoors. Purple and maroon mean air pollution is extreme, and everyone should try to stay in an indoor environment with clean air.
- **Reduce pollutants in your home.** Don’t let anyone smoke in your home. Avoid burning candles, incense, or wood fires. Run fans or open a window when cooking. Use a vacuum with a HEPA filter instead of sweeping to avoid stirring up dust and allergens.

Inside Out • One good thing about indoor air pollution is that many causes can be removed or changed.

“It’s difficult to change the outdoor environment,” Phipatanakul says, “but indoors is more contained.”

A simple tool for many homes is making sure inside air has a chance to escape. “Ventilating your house, such as opening windows, can actually lower the air pollution levels inside, and it really doesn’t cost anything,” Hansel explains.

This strategy may not work on days when outdoor pollution is very high, she says. Paying attention to the AQI or other measures of outdoor air quality can help you decide when to let inside air out.

Learn more about air pollution at www.niehs.nih.gov/health/topics/agents/air-pollution/index.cfm. ■

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**Web
Links**

For more about air quality and your health, see “Links” in the online article: newsinhealth.nih.gov/2018/09/breathe-easier

Smelling Sickness

Body Odor May Be Sign of Disease

Did anyone ever tell you that you smell bad? Funky breath or stinky underarms can happen to anyone, at any age. Whether or not you've noticed them, some body odors can signal a health problem. But most breath and body odors are normal.

"Bad breath is most often caused by bacteria on the teeth and tongue," explains Dr. Madeleine S. Deming, an internal medicine expert at the NIH Clinical Center.

It's normal if your breath smells a little in the morning, especially if you slept with your mouth open. A dry mouth allows bacteria to thrive. Bacteria that live in the mouth can make compounds that have sulfur. These compounds are especially stinky. They can smell like rotten eggs or onion, for example.

If bad breath isn't cleared up by brushing your teeth or using mouthwash, it may be a sign of another issue. Over time, bacteria can cause tooth decay and gum disease. Decay and gum disease do not smell good. Both require a trip to the dentist for treatment.



released through your sweat glands. That can make your armpits and skin smell bad. It's normal for stress to cause smelly compounds to be released through your sweat.

But your armpits can smell for other reasons too. Both moisture and hair enable bacteria to thrive. These bacteria can make smelly compounds. Bathing, shaving, and deodorant can help keep these odors in check.

Because certain diseases cause breath or body odors, NIH-supported researchers are developing an electronic "nose" to help doctors detect them. This research is at an early stage. In the lab, scientists can already analyze odor compounds from the body. They've even trained dogs to detect signs of certain cancers in breath samples.

If you're concerned about a new or worsening body odor, "a trip to the doctor for evaluation is always the first step," Deming advises. "Bad breath is best assessed by a dentist."

Your dentist can examine your mouth for signs of trouble. If body odor is your concern, your doctor can conduct a physical exam. If needed, your doctor can suggest further tests.

"A trial of avoiding foods that are known to cause body odor may be considered. In rare cases of body odor due to an underlying medical condition, the treatment of that condition may help to manage the odor as well," Deming says.

See the Wise Choices box for some ways to prevent strong breath and body odors. ■

Other causes of foul breath odor may be sinus, throat, or lung infections. These need to be treated by a health care professional, too.

Your breath can also carry clues of disease from other parts of your body. That's because you exhale more than just air. Your breath also contains gassy compounds that move from your organs through the bloodstream into your lungs.

Breath that smells fruity or like rotten apples, for example, can be a sign of diabetes that's not under control.

Rarely, people can have bad breath because of organ failure. A person with kidney failure may have breath that smells like ammonia or urine. Serious liver disease can make breath smell musty or like garlic and rotten eggs.

Compounds that are transported through the blood can also be



Wise Choices

Concerned About a Body Odor?

To prevent strong breath or body odor:

- Bathe, wear clean clothes, and use deodorant.
- Clean and care for your teeth and mouth.
- Keep your mouth moist and your body dry.
- Avoid eating onions, garlic, and other strong-smelling foods.



Web Links

For more about body odors and health, see "Links" in the online article: newsinhealth.nih.gov/2018/09/smelling-sickness



Health Capsules

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

Weight Loss Helps Knee Arthritis

Recent research shows that people who are overweight can reduce their symptoms of knee arthritis by losing at least 20% of their weight.

Millions of older adults have stiff, painful knees caused by arthritis. Arthritis causes a breakdown of the cushion of tissue inside the knee joint. Without this cushion, bone can rub against bone. That may cause pain and swelling. Being overweight could make the symptoms worse.

Experts generally advise adults who are overweight or obese to lose at least 10% of their weight to reduce symptoms of knee arthritis.

Recently, an NIH-funded research team wondered whether 20% weight loss would help reduce symptoms even more.

The study included 240 overweight and obese adults over 55 with painful knee arthritis. The research team helped them to exercise and diet to lose weight.

The researchers compared the people who lost 20% or more body weight with those who lost 5%. The people who lost 20% or more reported less pain. They could walk farther in a 6-minute test. In addition, blood tests revealed a much

lower level of a substance related to pain and swelling.

“The importance of our study is that a weight loss of 20% or greater—double the previous standard—results in better clinical outcomes and is achievable without surgical or pharmacologic intervention,” says lead researcher Stephen P. Messier at Wake Forest University.

The researchers are planning to enroll three times as many people for their next study of pain reduction from diet and exercise. ■

Prevent Lead Exposure

Lead is toxic. No amount is safe. The more you have in your body, the worse its effects.

Lead is a metal found in nature. It can get into your body in many ways. You might breathe, drink, or eat things that have lead.

In the US, lead used to be added to gasoline and paint. Homes built before 1978 may still have lead paint. When the paint peels and cracks, it makes lead dust you may breathe in or small children may eat.

Older homes can also have lead in the pipes. It can end up in your drinking water.

Be careful about using lead-glazed pottery and porcelain for food or drinks. Sometimes lead leaches out.

Lead can also be found in some painted toys. Kids put toys and their hands into their mouths. And small children are at most risk of lead poisoning.

Lead is linked to a lower IQ score, learning challenges, and behavior

problems in kids. A high level of lead is also linked to delayed puberty and hearing problems.

In adults, a high level of lead is linked to high blood pressure and tremor. It also can cause kidney, heart, and nerve problems.

If you're concerned about lead, your local health department can tell you how to test for lead in your home. Learn more about lead at www.niehs.nih.gov/health/topics/agents/lead. ■



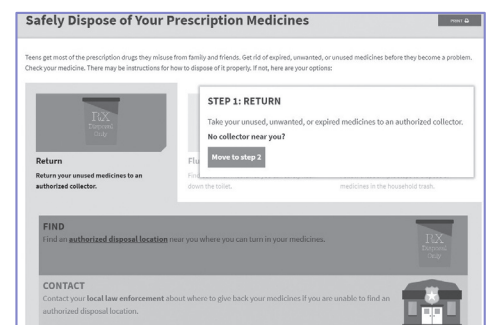
Featured Website

Safe Disposal of Prescription Drugs

teens.drugabuse.gov/parents/safely-dispose-your-prescription-medicines

Teens who misuse prescription drugs most often get them from friends and family. Keep your medicine out of teens' hands.

This interactive website shows you how to get rid of expired, unwanted, or unused prescription drugs.



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