



# Indoor air pollution

You probably know that it's harmful to breathe in polluted air when you're outside. The same is true when you're indoors. We spend about 90% of our time indoors – at home, at work, at school, or when we go to shops or restaurants. Poor indoor air quality has been linked to lung diseases like asthma, COPD and lung cancer.

## What is indoor air pollution?

Indoor air pollution is dust, dirt or gases in the air inside a building such as your home or workplace that harms us if we breathe it in.

Types of air pollution include:

- particulate matter (PM) – microscopic particles of dust and dirt in the air
- gases – carbon monoxide, nitrogen oxides, sulphur dioxide

Indoor air pollution can be caused by many things. These include:

- how you heat your home
- how you cook
- poor ventilation
- damp
- chemicals in cleaning products
- some building materials

You may experience indoor air pollution at your home, workplace or in other buildings.

The quality of the air you breathe anywhere is especially important if you're living with a lung condition like asthma or chronic obstructive pulmonary disease (COPD).

## Who's at risk from poor indoor air quality?

Everyone is at risk from indoor air pollution. If you've got COPD, asthma, bronchiectasis or any other lung condition, you're much more likely to be affected by poor air quality.

If you have a lung condition you may also spend more time indoors. This means you may have more contact with things that affect the air you breathe. These could include cigarette smoke, cleaning materials or mould.

Children are particularly vulnerable to poor indoor air quality as their lungs are still developing. Their airways are smaller, so inflammation caused by pollution can cause them to narrow more easily than in older people. Pollution can also interact with allergens to cause asthma in children.

## What are the effects of poor indoor air quality?

If you've been breathing in polluted air for days or weeks at a time, you might start to notice a dry throat or a cough. You might also feel short of breath, wheezy or have an itchy or runny nose.

Indoor air pollution is linked to increased risk of pneumonia, COPD and lung cancer. Pollution in your home can also increase the risk of heart disease and stroke.

If you've developed an allergy to something in your home, you'll usually get itchy and runny eyes, a runny nose and inflamed, swollen sinuses. Breathing through your nose can be difficult too, and you might have a cough. If you have asthma, your symptoms might get worse if you have an allergic reaction to a pollutant in the air.

Some types of indoor air pollution are more dangerous than others. If you're exposed to dangerous types of pollution, such as asbestos or radon, for a long time, the effects can be very serious.

## What causes poor indoor air quality?

The quality of the air we breathe indoors is affected by many things. On this page we explore the most common causes of indoor air pollution and how you can avoid them.

The air indoors can be affected by:

- chemicals we use when we clean or decorate
- how we heat and cook in our homes
- building materials used in the construction
- tobacco or cannabis smoke

The air indoors can also be affected by how a building is ventilated, room temperature, damp and condensation, and pollution that has come indoors from outside. Many people also experience allergies to things in their home such as dust mites and their pets.

## Can the chemicals in cleaning products affect my lungs?

We use a wide range of household chemicals every day to clean and decorate our homes. These products can contain chemicals sometimes called **VOCs - volatile organic compounds**. Other cleaning products may contain bleach or ammonia.

VOCs evaporate into the air when we use them or sometimes even while they're being stored. Products with fragrances such as citrus and pine can react when they are released into the air, forming new chemicals. Some examples of VOCs are acetone, xylene and formaldehyde. It's a good idea to avoid breathing in too many VOCs.

More rigorous research is needed before we can be certain about the effects of breathing in these chemicals in our homes. About half of studies suggest that being exposed to these chemicals increases your risk of developing an allergy or asthma.

One study recently found that women who clean at home or work have also been found to have an increased decline in their lung function.

If you use irritating cleaning products, such as those based on bleach, particularly if you apply them with a spray, you may get respiratory irritation and symptoms if you have a long-term lung disease. Studies have also found that if you use these products over a number of years it may cause asthma.

Formaldehyde is a VOC. You can sometimes find formaldehyde in carpets, furniture, shelving and flooring. It can irritate your lungs. This can be why some people say the smell of a new sofa or soft furnishing sets off their allergies or makes their asthma worse.

If this applies to you, try to avoid products containing formaldehyde. Products containing formaldehyde should be clearly labelled under EU regulations.

### Where can I find VOCs?

You'll find these chemicals in cleaning and DIY products, such as:

- detergents
- furniture polish
- air fresheners
- carpet cleaners
- oven cleaners
- pesticides and fungicides
- paints and paint strippers
- varnishes
- glues

### What can I do to avoid cleaning products with VOCs?

If you believe the chemicals you use in your home affect your health, there are a few things you can do.

- Consider other ways of cleaning. The best way to avoid coming into contact with chemicals found in cleaning products is not to use them. If you can, use a damp cloth to clean instead.
- Avoid chemical-heavy products. Look for products that are labelled allergy friendly, as these have lower levels of volatile chemicals and are usually fragrance-free.
- Investigate using 'natural' paints, but be aware paints advertised as water-based or low VOC may still contain hazardous chemicals.
- Avoid sprays. When possible, use solid or liquid cleaning products rather than sprays. Sprays get into the air, which means you can breathe them in more easily and they can get further down into your airways. If you think the smell of cleaning products triggers your symptoms, go for unscented products.
- Ventilate your home. Always open a window when you are cleaning or decorating to make sure there is plenty of ventilation.
- Bear young children in mind. Babies and very young children are more affected by chemical emissions than adults.
- Read the label. Finally, always remember to follow advice on the labels of products about how to use them safely. Dispose of partly-used containers through your local recycling centre.

## How does heating and cooking affect indoor air quality?

Cookers, heaters, stoves and open fires can release pollutants into your home. Remember that inhaling any smoke is harmful.

Heating and cooking can release two types of pollutants:

- particulate matter (PM) – microscopic particles of dust and dirt in the air
- gases – carbon monoxide, nitrogen oxides, sulphur dioxide

Exposure to these pollutants can lead to lung and heart disease.

Once these pollutants are in your home, it's essential to air your home with fresh air from the outside to dilute and remove them. That's why gas heaters and cookers that have a flue, chimney, or other kind of vent that allows the polluted air out of your home, are better for lung health. Chimneys from solid fuel stoves and fireplaces need to be cleaned and swept regularly by a registered sweep. If this isn't done devices become less efficient and carbon monoxide can build up.

### Burning wood and coal

Burning wood and coal in a stove or on an open fire releases particulate matter. This can irritate your nose and throat, giving you a cough or breathing problems. It also causes early deaths from lung and heart disease.

If you have asthma, your symptoms might get worse. If you have COPD, it makes you more likely to have a flare-up. In the long term, your risk of getting lung cancer is also increased from burning coal or wood. If you live in an urban area, burning wood or coal, will add to outdoor urban air pollution. Open fires produce greater emissions than stoves.

Burning wood accounts for 23 to 31% of the particle pollution in London and Birmingham. Other cities will have similar levels as a result of burning wood. This problem is much worse on winter evenings.

Studies have shown that smoke from wood heating enters neighbouring homes too. UK researchers have also suggested that wood burning in densely populated areas may lead to PM exposures comparable to those from traffic sources.

To reduce particulate pollution from burning wood, smoke control areas cover the UK's largest cities. Ask your local council's environmental health department to find out if you live in a smoke control area. If you do live in a smoke control area, this will restrict what you can burn and the types of stove you can use, although many wood-burning stoves are exempt from the requirements. Find out what you can and can't burn in a smoke control area.

There's controversy about using wood-burning stoves, and the UK government has consulted about their use as part of their Clean Air Strategy. Given the contribution to environmental pollution, carefully consider the issues before you buy a new stove.

### What about gas or electric heating and cooking methods?

When you cook with either gas or electric, tiny particles are also released that are easily inhaled. Higher concentrations of these particles are released when cooking with gas. Gas cooking also produces gaseous emissions, including carbon monoxide, formaldehyde and oxides of nitrogen, all of which can cause respiratory health problems.

## Carbon monoxide

The most dangerous pollutant is carbon monoxide, which can kill you within a few hours. It's a poisonous gas with no smell or taste. Carbon monoxide is created when fuels like gas, oil, coal or wood don't burn fully. It's important to make sure cooking and heating appliances are serviced regularly, and that vents and chimneys are not blocked. Although carbon monoxide does not have a smell, if an appliance isn't working properly it may produce more soot.

If you have mild carbon monoxide poisoning, the first symptom you might notice is a headache. You might also notice flu-like symptoms, but without the temperature.

If several people in one building develop flu-like symptoms without a temperature, then it could be due to a carbon monoxide leak – so act immediately. Switch off all gas appliances and ventilate the property. Call the gas emergency number 0800 111 999 or the Health and Safety Executive Gas Safety Advice Line on 0800 300 363.

### How can I reduce the pollution produced during cooking and heating?

- Make sure all your gas appliances are regularly maintained by a certified engineer.
- Install extractor fans over your gas stoves and ranges, and always use them.
- Avoid open fires and wood-burning stoves. If you can, use gas or electricity to cook and to heat your home.
- If you must burn coal or wood, make sure the chimneys are inspected and swept regularly by a HETAS qualified sweep. If you're thinking about buying a wood-burning stove, please think about the outdoor air pollution it will cause to your neighbours' air quality and to the quality of the air entering your own home. And if you go ahead, choose a modern, lower-emission one. Only burn dry, unpainted and untreated wood. Look for wood with the 'ready to burn' logo. Don't burn rubbish or packaging as this can create toxic substances. Lighting your fire with plenty of kindling and ensuring a good air supply in your stove fire box will reduce the particle emissions. In the future, the government will only allow the very cleanest stoves and fuels to be bought.
- Avoid buying a wood burning stove or using an open fire if someone in your household has a lung condition or if you live in a town or city.
- Install alarms for both smoke and carbon monoxide - these are separate alarms. Check the batteries regularly.
- For additional advice you may want to read the **Department for Environment, Food and Rural Affairs' practical guide** on open fires and wood-burning stoves.

## Candles and incense

Candles and incense sticks also emit particles and other pollutants when they burn. There is evidence linking incense burning to lung disease so high levels of exposure should be avoided. Incense sticks emit more than 100 times the number of fine particles as a candle. A single candle in a living room can also substantially increase the particle concentration in the air while it's burning, but over a 24-hour period the increase is minimal. Scented candles emit small amounts of formaldehyde and VOCs but if you only use them occasionally, are unlikely to pose much of a health risk.

### Top tip

Don't light several candles or incense sticks in a small room such as a bathroom.

## How can building materials affect air quality?

The most significant building material with lung health risks is asbestos, which has been banned in the UK since 1999. But older properties may still have asbestos-containing materials.

Before its dangers were known, asbestos was often used in buildings for insulation, flooring and roofing and sprayed on ceilings and walls. If you breathe in asbestos fibres, this can lead to lung diseases decades later.

## What should I do if there's asbestos in my home?

If you find asbestos in your home, make sure it remains undisturbed. If it's damaged or deteriorating, get it removed by accredited professionals.

**Fibreglass** and other synthetic mineral fibre products can release fibres when trimmed, cut or sanded. These products are often found in the loft space in homes. Larger fibres could irritate your skin, nose and throat. If you discover fibreglass in your home, don't disturb it. If you come into contact with it, wear a mask and protective clothing.

**Building materials can also contain VOCs** (volatile organic compounds.) These include roofing and flooring materials, insulation, cement, coating materials, heating equipment, soundproofing, plastics, glue and plywood.

## How can the land on which my home is built affect the air quality?

If your home is built on ground with a higher level of radon, you can take measures to reduce it. You can find out if your home is in a radon-affected area at UKradon.

### What is radon?

Radon is a natural radioactive gas that comes from rocks and soil. It's colourless and odourless.

Certain areas of the UK have higher levels of radon. The radon level in the air we breathe outside is very low, but it can be higher inside poorly ventilated buildings.

High levels of radon can cause lung cancer. The higher the level of radon, and the longer you are exposed, the greater the risk will be.

Indoor radon often varies from building to building. If your home is affected, UKradon has a tool to help you decide if you need to reduce the level and how.

## Which are the safest building materials?

Consider using building materials with low VOC emissions. Look for products and materials that show they are environmentally friendly and low in pollutants and emissions. You can find sustainable products on the website of **The Alliance for Sustainable Building Products**.

## If I have asthma or COPD, what should I do if there is building work in my home?

If you - or anyone working in your home - use materials that might trigger your symptoms, keep your home well ventilated during the building work and for a few days afterwards.

Ask the builder to do preparatory work such as cutting or mixing materials outside. You might even want to consider moving out while the work is going on.

## Tobacco smoke in your home

Smoking is the main cause of preventable illness and preventable death.

Second-hand tobacco smoke is also bad for our health. That's why laws have banned smoking in enclosed public spaces, including public transport and workplaces, and in cars with children.

If anyone smokes in your home, tiny particles from tobacco smoke can drift all through your house. These particles can remain at harmful levels for up to five hours.

### What are the effects of tobacco smoke?

If you breathe in this smoke, your nose or throat can get irritated and you might cough or have trouble breathing.

If you have asthma, your symptoms are likely to get worse. And if you have COPD, you are more likely to have a flare-up. In the long term, your risk of getting lung cancer is also increased.

Children are particularly at risk. Breathing in tobacco smoke affects how their lungs work and makes them more likely to develop a long-term lung condition when they grow up.

Using e-cigarettes is less harmful than tobacco smoking, but these devices are not completely harmless. If you decide to use an e-cigarette at home, it should be kept out of reach of children and if you are a parent or carer you should consider the benefits and drawbacks of permitting vaping in the home.

What can I do about tobacco smoke in my home?

- Don't smoke indoors, and don't allow others to smoke in your home. Make sure anyone looking after your children does not smoke when they are with them.
- If you smoke at home, rather smoke outside, close the door behind you and move away from the side of the house.
- If you smoke, the most important thing you can do to improve your health is to quit .

## Allergies in your home

Sometimes people develop allergies to things in their home. This happens when your body's immune system becomes confused, mistaking something encountered every day as a harmful risk like an infection. When this happens, the trigger is called an allergen.

Your immune system mistakenly targets the allergen, giving you an allergic reaction. This involves producing a lot of antibodies to fight off what it sees as a risk.

The next time you come into contact with the allergen, your body remembers, and produces yet more antibodies. This makes your immune system release chemicals that trigger an allergic reaction.



## What are the symptoms of allergies?

If you're allergic to things in your home, you're likely to get a runny or blocked nose, itchy, red or watering eyes, wheezing, a cough or breathlessness. Other symptoms could include itchy skin or rashes. If you have asthma, your symptoms are likely to get worse.

Allergies to house dust mites, pets and mould spores are common in people with asthma and may impact their breathing.

If you think you have an allergy, tell your GP. They will be able to advise you if you need treatment or they may refer you to a specialist allergy clinic to be tested.

Remember, if you live with asthma or another lung condition and you think you're allergic to something in your home, stick to your asthma or COPD plan, if you have one. Take your medication as prescribed, including your preventer inhaler.

## How do dust mites affect air quality?

Everyone has dust mites in their home. They are microscopic insects that live off human skin and form part of the dust in our homes. They thrive in humid and damp places, and are found particularly in bedding, soft furnishings and carpets.

The mites' droppings become fine particles in the air and quickly settle into pillows, mattresses, duvets, carpets and upholstery.

It doesn't matter how clean and tidy you are, unfortunately – it's impossible to completely get rid of them.

## What can I do if I have a house dust mite allergy and asthma?

If you have asthma and are affected by dust mites, the best way to minimise its impact on your asthma is to regularly take your preventer medications and follow your asthma management plan.

Patients with asthma can find that avoiding certain environmental triggers helps to manage their symptoms. But scientific evidence about the effectiveness of these interventions is limited. Health care professionals generally do not recommend methods that are supposed to reduce house dust mite levels in the home, such as using mattress covers, vacuum cleaning, ventilation, freezing, washing, air filtration or air ionisers.

## Pets and allergies

### What is a pet allergy?

A pet allergy is when a person has a reaction to a pet's skin cells, saliva or urine. Sometimes people are allergic to dander - the dead flakes of skin that a pet sheds.

Dander is very small and can stay in the air for a long time. It collects on upholstered furniture and sticks to your clothes. Research has found it takes several months for cat allergens to disappear from a home after a cat has left.

Any animal with fur can be a source, including pets referred to as 'hypoallergenic' or 'low allergy'. It's most common to develop an allergy to cats, dogs and rodents such as mice, rats and ferrets.

Birds can also trigger allergic reactions and asthma symptoms because of their feathers. A powder called feather dander is released when birds clean their feathers, play or wash.



If you're breathing in dust caused by birds, you can have an allergic reaction called extrinsic allergic alveolitis that leads to inflammation of your lung's air sacs. The inflammation can develop into a longer-lasting condition that permanently scars your lungs.

If you spend a lot of time around birds in your working or home life and have symptoms continuously, ask your health care professional for advice.

### What can I do about my pet allergies?

It will be a difficult decision, but if you think you have an allergy to your pet, you may need to consider rehoming the animal if you can't cope with your reaction. Before you decide, get an allergy test to make sure that you're reacting to your pet and not something else, such as smoke or pollen.

There is limited scientific evidence showing whether these interventions work in reducing the effects of pet allergies. But, if you do have a pet allergy, you might consider some of the following:

- not letting it into your bedroom or other rooms where you spend most of your time
- cleaning your home regularly
- washing your pet regularly
- if your pet lives in a cage, asking someone else to clean it
- removing carpets and replace them with smooth floors, such as wood, laminate, bamboo or lino
- keeping the rooms where you spend most of your time well-aired, such as by opening windows
- try using air filters and a high efficiency vacuum cleaner, although there is currently limited evidence on how helpful this actually is. High-efficiency particulate vacuum cleaners may reduce the amount of dander stirred up by your cleaning
- high-efficiency air purifiers, known as HEPA filter devices, may also reduce airborne pet allergens. But the evidence for reductions in asthma symptoms is less clear

### What can I do to improve air quality in my home?

Nowadays many buildings are tightly sealed, meaning very little fresh air gets in and air pollutants can linger. To get rid of them, keep your home well-aired. But remember that outdoor air pollution can also travel inside. Check your local outdoor air pollution levels regularly and consider avoiding opening windows at times when the Daily Air Quality Index is high or very high.

#### Tip

You can check your local air pollution levels at [uk-air.defra.gov.uk](http://uk-air.defra.gov.uk)

### Keep your home well-aired

Open your windows or skylights for 5-10 minutes several times a day, especially if you're cooking or using the shower.

If you're having building work done, ask how your home will be aired, and if there'll be dust or a chemical smell. If you think your health might be seriously affected, think about staying somewhere else while the work is going on or ask the builder to do the polluting work outside.

Air filtration systems can reduce the background concentrations of particulate matter. But the limited evidence available suggests they probably only work well in small rooms.

## Look out for condensation

In Britain, a lot of our houses are old, and the weather can be wet and cold, so we must watch out for our homes getting damp and mould growing.

Damp leads to condensation, which encourages mould and other fungi to grow. Lots of things can cause this, from cooking to washing and drying clothes. Condensation is more likely to happen in cold places in your household, like windows or rooms with external walls.

If your home's damp, you might have an irritated nose and throat, or feel short of breath. If you have asthma, your symptoms may get worse. It's common to have an allergy to moulds.

One fungus often found indoors is called aspergillus. It grows on dust and powdery food items like flour. It can cause a wide range of conditions, from mild irritation of your airways to more serious infections if you have a lung condition.

## How do I prevent condensation in my home?

- Do your best to prevent leaks from your roof and any water damage
- Keep your home well-aired
- Use your extractor fan when cooking or showering to suck moisture out of the air, and keep the door closed to stop damp air spreading
- Dry your washing outside, if you can
- Wipe down your windowsills daily to keep condensation down
- If you find any mould, remove it straight away

If you have bad damp, mould or fungi, get professional help to deal with it – especially if you think it might trigger your breathing problems. If you are renting, you should tell your landlord about the problem and they should arrange to fix the underlying cause. Shelter has advice on dealing with damp and mould in a rented home.

## Drying your washing

One study found that 30% of moisture in homes in Scotland is from drying clothes indoors. Dry your washing outside if you can!

If you can't, the study recommends using a well-ventilated utility room or a low-energy drying cupboard. It also suggests that tumble driers are healthier, though they are expensive and use more energy.

## Keep your home at a comfortable temperature

Air pollution can affect your breathing, but so too can low or high temperatures. High humidity, for instance, allows for the air in your home to stay moist, making it easier for mould to grow.

Keep rooms you spend a lot of time in, like your bedroom, at a comfortable temperature. The recommended temperature is 18°C (64°F). Don't forget the importance of airing your home though.

In cold weather, you might prefer your living room to be slightly warmer during the day. This is especially likely if you feel the cold and can't move around very easily, or if you know that cold or moist air can trigger a flare-up.

In winter, close your bedroom window at night, as breathing in cold air increases the risk of chest infections.

In most cases, following the common-sense rules outlined above is all you need to do to have good air quality. If you want to have the air quality in your home or any other building tested, there are companies which offer this service. There are also a wide range of indoor air sensors that can be used to measure dust, carbon monoxide and other gases, and VOCs as well as relative humidity and air temperature. Some of these also monitor carbon dioxide concentrations, which can identify when a room is stuffy and needs to be aired.

## What are the risks of indoor air pollution in my workplace?

Indoor air pollution isn't only a problem in your home, it can also be a problem in the workplace. In some jobs, you might be exposed to much higher concentrations of certain air pollutants than you would be at home or you may experience more dangerous substances than you would find at home.

At work you could be exposed to substances that can make your airways more sensitive, called asthmagens. Asthmagens are substances that can lead to the development of asthma. They include certain vehicle spray paints, dust from flour, wood dust, metal working fluids and cleaning agents. Exposure to these substances can lead to asthma or make your asthma worse.

Other risks of air pollution in the workplace include asbestos fibres, welding fumes and silica dust. Silica dust can also be dangerous and is found in products such as brick and concrete. Welding is a common industrial process that releases fine particulate matter and toxic gases. If you work as a cleaner, you will also be exposed to VOCs. One study recently found that women who work as cleaners have increased decline in their lung function. You can read more about VOCs and how they can affect you.

## How do I protect myself from indoor air pollution in my workplace?

You have the right to work in a place where the risks to your health and safety are properly controlled by your employer. Workplace regulations are there to protect you from potentially harmful pollutants. The company that you work for should do a risk assessment to identify what could harm you and if necessary how they must control these risks. If you are worried about the health and safety at your place of work, talk to your employer, supervisor or health and safety representative. If they can't address your concerns, you can report the problem to the regulator at [hse.gov.uk/contact/concerns.htm](https://www.hse.gov.uk/contact/concerns.htm).

### Tip

Find out more about air pollution in your workplace on the Health and Safety Executive's website [www.hse.gov.uk/lung-disease/](https://www.hse.gov.uk/lung-disease/) or at Breathe Freely ([www.breathefreely.org.uk/](https://www.breathefreely.org.uk/)).

### Get in touch with us to find support near you.

Helpline: 03000 030 555

Monday to Friday, 9am-5pm

Ringing our helpline never costs more than a local call and is usually free, even from a mobile.

[helpline@blf.org.uk](mailto:helpline@blf.org.uk)

[blf.org.uk](https://www.blf.org.uk)

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