HEALTH BASICS

Radon

Radon is a radioactive gas that can build up indoors and increase lung cancer risk.

WHAT IT IS
A colorless, odorless radioactive gas from soil and rock

WHERE IT COMES UP
Home tests, property transactions, workplaces, and indoor-air checks

WHY IT MATTERS
Long-term inhalation raises lung cancer risk

WHAT IT IS NOT
Not a disease or medical diagnosis

WHO TO ASK
Local radon program or certified radon professional

HOW IT IS CHECKED
Indoor-air testing over a stated sampling period

Overview

Radon is a naturally occurring radioactive gas. It forms when uranium in soil, rock, and water slowly breaks down. Uranium is present in different amounts in the ground around the world.

Radon has no color, smell, or taste. You cannot tell whether it is present without testing. Outdoors, it usually becomes diluted in the air. Indoors, it can enter through gaps and openings that connect a building to the ground and may build up.

Any building can have an elevated radon level. This includes new and old homes, homes with or without basements, schools, and workplaces. A neighbor's test result cannot show what the level is in your home.

Radon is not a disease or a diagnosis. It is an environmental exposure linked to lung cancer. Finding a high level does not mean that you have cancer, and it is usually possible to reduce the level without moving.

How it works

Air pressure inside a building is often slightly lower than the pressure in the soil beneath it. This

can draw soil gases, including radon, through foundation cracks, floor joints, gaps around pipes, drains, crawl spaces, and other openings.

Some radon may also come from building materials or groundwater. Radon released from water into indoor air can matter in certain areas, especially where private wells draw from radon-rich rock. For most people, radon entering from the soil is the main concern.

When radon breaks down, it produces tiny radioactive particles known as radon decay products. These particles can attach to dust and other material in the air. If inhaled, they may settle in the lungs and release alpha radiation. Over time, this radiation can damage the DNA inside lung cells.

Radon levels can change from day to day and between seasons. Weather, ventilation, heating, construction, and the way a room is used can affect a measurement. A test therefore represents the level during its stated testing period rather than a fixed value for all time.

Radon is commonly measured in picocuries per liter, written as pCi/L, in the United States. Many other countries use becquerels per cubic meter, written as Bq/m^3. These are different units for measuring radioactivity in air.

Why it matters for your health

Long-term radon exposure increases the risk of lung cancer. The risk generally rises as the radon level and length of exposure increase.

Smoking and radon have a combined effect. People who smoke and are exposed to radon have a much higher lung cancer risk than people exposed to either one alone. If you smoke, reducing both tobacco exposure and indoor radon offers more protection than addressing only one.

Radon exposure does not usually cause immediate illness. It does not produce a distinctive cough, headache, or breathing sensation that tells you the level is high. Testing the building is the only practical way to know.

A radon result is not a medical test. There is no standard blood, urine, or imaging test that can calculate how much radon you have previously inhaled. A high home result also does not show whether lung damage has occurred.

Medical lung cancer screening is based mainly on age and cigarette-smoking history under current screening guidelines. Radon exposure alone does not automatically mean that a person should have a screening scan. A clinician can help you review whether you meet the screening criteria used where you live.

What can go wrong

The main health concern related to radon is lung cancer after long-term exposure. Not everyone exposed to radon develops cancer, but there is no known indoor level that is completely free of risk.

Several practical situations can lead to continued exposure:

A single short-term result can be influenced by temporary conditions. Depending on the result and local guidance, another short-term test or a longer-term test may provide a better estimate. Do not disregard a high result, but understand that it is generally an indoor-air problem to address rather than a medical emergency.

Radon is different from carbon monoxide. Carbon monoxide can cause sudden poisoning, while radon creates risk through long-term exposure. A sounding carbon monoxide alarm, sudden severe breathing difficulty, collapse, or confusion requires immediate action and emergency help. Do not assume those events are caused by radon.

- An indoor radon level is elevated but no follow-up test or reduction work occurs
- A test is placed incorrectly or moved before the testing period ends
- Windows, doors, or ventilation are changed in ways that conflict with test instructions
- A mitigation system stops working and is not noticed
- Only one part of a large or unusual building is tested
- A property transaction is completed without understanding an old or incomplete result

What you can do

Test the indoor air. Use a radon test kit accepted by your national or local radon program, or arrange testing through a qualified radon professional. Follow the instructions exactly, including where to place the device and whether windows and outside doors must remain closed.

Testing is usually done in the lowest level that is regularly occupied or could be used as living space. The correct location can differ for a home, apartment, school, or workplace.

Short-term tests measure radon over days or weeks. They provide a faster result but are more affected by temporary changes. Long-term tests run for more than 90 days and give a better estimate of the average level across seasons.

Compare the result with the action level used where you live. In the United States, the

Environmental Protection Agency recommends fixing a home at 4 pCi/L or above and considering action between 2 and 4 pCi/L. Other countries may use Bq/m^3 and different reference levels. Your local radon program can explain the result and whether confirmation is advised.

If the level needs to be reduced, ask a qualified radon mitigation professional about the building. A common method, called active soil depressurization, uses a pipe and fan to draw radon from beneath the building and release it outdoors. Sealing foundation openings may support a system but is not usually reliable as the only measure.

After mitigation, test again to confirm that the system is working. Keep the original result, the mitigation plan, post-work results, and system maintenance records. Follow local advice about future testing, particularly after major changes to the foundation, heating, or ventilation.

If you rent, give the result to your landlord or property manager in writing and keep a copy. Radon responsibilities and tenant protections differ by location, so a local housing or radon service may be helpful.

There is no routine medical test you need solely because a building has an elevated result. If you currently smoke, you can ask a clinician or stop-smoking service about support. If you previously smoked, ask whether your age and smoking history meet local lung cancer screening criteria.

Common questions

Can I tell whether my home has radon without testing?

No. Radon cannot be seen, smelled, or tasted. Home age, foundation type, and neighborhood results cannot replace a test.

Does an elevated result mean I need to move?

Usually not. Established mitigation methods can often lower indoor levels. A qualified professional can assess the building and confirm the result after work is completed.

Are upper floors safe?

Radon levels are often highest near the ground, but upper floors are not automatically free of radon. Apartments above ground level may still be affected by building airflow, ventilation, and construction features.

Will an air purifier solve the problem?

A standard air purifier does not stop radon from entering a building and is not a substitute for radon mitigation. Some filters may capture particles carrying radon decay products, but this

does not reliably control the source.

Should I test during a property purchase?

Radon testing can provide useful information during a sale or rental decision. Ask who performed the test, where the device was placed, how long it ran, and whether a mitigation system has been retested.

Is radon in drinking water important?

Radon can occur in groundwater, especially from some private wells. The greater risk is usually from breathing radon released into indoor air. If a high indoor result may be linked to well water, ask your local environmental health or drinking-water service whether water testing is appropriate.

Sources

- US Environmental Protection Agency. A Citizen's Guide to Radon: The Guide to Protecting Yourself and Your Family from Radon
- US Environmental Protection Agency. Home Buyer's and Seller's Guide to Radon
- US Environmental Protection Agency. Radon Guide for Tenants
- Centers for Disease Control and Prevention. Radon and Your Health
- National Cancer Institute. Radon and Cancer
- World Health Organization. WHO Handbook on Indoor Radon: A Public Health Perspective . 2009