

This fact sheet answers the most frequently asked health questions (FAQs) about radon. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Radon is an odorless, radioactive gas formed from the breakdown of uranium and thorium. Exposure to high levels results in an increased risk of lung cancer. Radon has been found in at least 34 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is radon?

Radon is a naturally occurring, radioactive, noble gas that is odorless and tasteless. It is formed as part of three radioactive decay chains that begin with uranium or thorium. These elements are found in small amounts in most rock, soil, and water. Each atom of uranium or thorium decays or transforms about a dozen times, each time expelling radiation and forming a different element with different radioactive properties. Radium and then radon are formed midway through these decay chains.

Since radon is a noble gas, it releases from any chemical bonds that attach it, and it may travel far enough to reach groundwater or the air.

Radon progeny is the term given to those radioactive atoms with short half-lives into which radon quickly decays. Air, soil, and water contain many atoms that are at various points in these decay chains. A sample of any one is expected to contain a mixture of these radioactive elements or isotopes, including radon and radon progeny.

What happens to radon when it enters the environment?

Radon gas in the rocks and soil can move to air, groundwater, and surface water.

Radon has a radioactive half-life of about 4 days; this means that one-half of a given amount of radon will decay to other products every 4 days.

Decay products of radon are solids that can be trapped inside the earth or, if in the air when radon decays, can attach to dust and other particles and move with the air.

How might I be exposed to radon?

Radon is normally found at very low levels in outdoor air and in drinking water from rivers and lakes.

It is normally found at higher levels in indoor air in homes, schools, and office buildings, and in well water.

Cracks in the basement or foundation of a home may allow higher levels of radon and radon progeny inside the home.

Elevated levels of radon and radon progeny can be found in areas with elevated levels of uranium and thorium. This can include most any mining or milling operation involving metals or phosphates.

How can radon affect my health?

When radon or radon progeny undergo radioactive decay, some of the decays expel high-energy alpha particles, which are the main source of health concerns.

Many scientists believe that the alpha particle radiation dose from long-term exposure to elevated levels of radon

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and radon progeny in air increases your chance of getting lung cancer. The greater your exposure to radon, the greater your chance of developing lung cancer.

How likely is radon to cause cancer?

The Department of Health and Human Services (DHHS), International Agency for Research on Cancer (IARC), and the EPA consider radon to be a human carcinogen.

How can radon affect children?

Smaller lungs and faster breathing rates may result in higher radiation doses to the lungs of children relative to adults. However, limited information from children employed as miners in China do not provide evidence of increased susceptibility to the effects of exposure to radon.

How can families reduce the risks of exposure to radon?

Indoor radon levels can be reduced by methods that include the sealing of pathways through which radon can enter a building and installing a ventilation system that routes air from underneath the building (either under the slab or in the crawl space) to outdoor air. For more information, contact your state radon office, a professional radon testing and mitigation firm, the National Environmental Health Association's National Radon Proficiency Program, or the National Radon Safety Board.

Is there a medical test to determine whether I've been exposed to radon?

Radon in human tissues is not detectable by routine medical testing. However, several of its decay products can be detected in urine and in lung and bone tissue. These tests cannot tell how much radon you were exposed to, nor can they be used to predict whether you will develop harmful health effects.

Has the federal government made recommendations to protect human health?

The EPA recommends fixing your home if measured indoor levels of radon are 4 or more picocuries per liter of air (4 pCi/L). The EPA also notes that radon levels less than 4 pCi/L still pose a health risk and can be reduced in many cases. If indoor radon levels need to be reduced, the EPA recommends using a certified radon mitigation specialist to ensure that appropriate methods are used to reduce radon levels.

The Mine Safety and Health Administration (MSHA) has adopted an exposure limit of 4 Working Level Months (WLM) per year for people who work in mines (WLMs basically combine the concentration of radon in mine air with length of exposure inside the mine).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Radon (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

