



Mid-Michigan District Health Department, Wednesday, January 26, 2022
Central Michigan District Health Department, Wednesday, January 26, 2022
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Radon

January is National Radon Action Month

The following information is a reproduction from the article "Radon and Cancer" from the [American Cancer Society, 2015](#), with some additions from the [EGLE Indoor Radon](#) website.

Radon is a colorless, odorless, radioactive gas. It forms naturally from the decay (breaking down) of radioactive elements, such as uranium, which are found in different amounts in soil and rock throughout the world. Radon gas in the soil and rock can move into the air and into underground water and surface water.

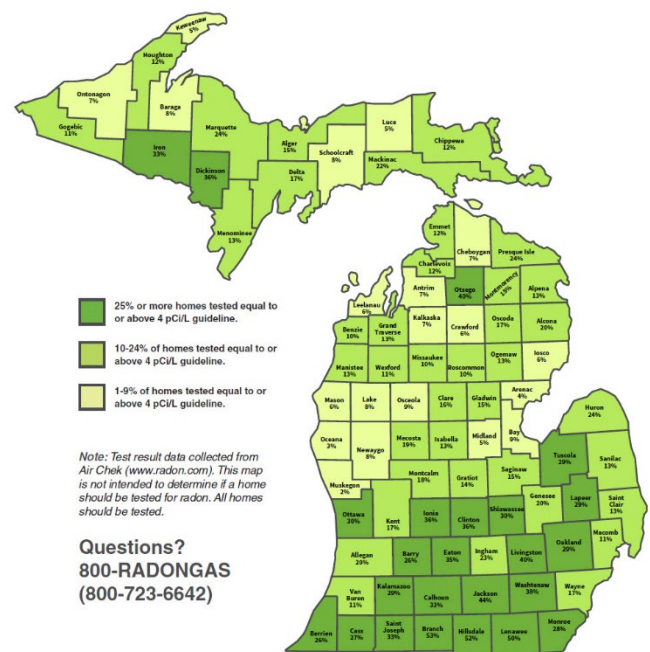
Radon is present outdoors and indoors. It is normally found at very low levels in outdoor air and in drinking water from rivers and lakes. It can be found at higher levels in the air in houses and other buildings, as well as in water from underground sources, such as well water.

Radon breaks down into solid radioactive elements called *radon progeny* (such as polonium-218, polonium-214, and lead-214). Radon progeny can attach to dust and other particles and can be breathed into the lungs. As radon and radon progeny in the air break down, they give off radiation that can damage the DNA inside the body's cells.

How are people exposed to radon?

At home and in other buildings

For both adults and children, most exposure to radon comes from being indoors in homes, offices, schools, and other buildings. The levels of radon in homes and other buildings depend on the characteristics of the rock and soil in the area. As a result, radon levels vary greatly in different parts of the United States, sometimes even within neighborhoods. Elevated radon levels have been found in every state. **In Michigan, one in every four homes is expected to have radon levels that exceed the recommended federal action level.**



Radon gas given off by soil or rock can enter buildings through cracks in floors or walls; construction joints; or gaps in foundations around pipes, wires, or pumps. Radon levels are usually highest in the basement or crawl space. This level is closest to the soil or rock that is the source of the radon. Therefore, people who spend much of their time in basement rooms at home or at work have a greater risk for being exposed.

https://www.michigan.gov/egle/0,9429,7-135-3312_4120_4196-10497--00.html

Small amounts of radon can also be released from the water supply into the air. As the radon moves from the water to air, it can be inhaled. Water that comes from deep, underground wells in rock may have higher levels of radon, whereas surface water (from lakes or rivers) usually has very low radon levels. For the most part, water does not contribute much to overall exposure to radon.

Radon exposure can also occur from some building materials if they are made from radon-containing substances. Almost any building material made from natural substances, including concrete and wallboard, may give off some level of radon. In most cases these levels are very low, but in a few instances these materials may contribute significantly to radon exposure.

Some granite countertops may expose people to different levels of radon. Most health and radiation experts agree that while a small portion of granite countertops might give off increased levels of radon, most countertops give off extremely low levels. According to the US Environmental Protection Agency (EPA), it's very unlikely that a granite countertop in a home would increase the radiation level above the normal, natural background level that comes from nearby soil and rocks. Still, people concerned about radon from countertops and from other household sources can test these levels using home detection kits or can hire a professional to do the testing.

According to the EPA, the average indoor radon level is about 1.3 picocuries per liter (pCi/L). People should take action to lower radon levels in the home if the level is 4.0 pCi/L or higher. Outdoors, radon generally disperses and does not reach high levels. Average levels of radon outdoors, according to the EPA, are about 0.4 pCi/L.

Does radon cause cancer?

Being exposed to radon for a long period of time can lead to lung cancer. Radon gas in the air breaks down into tiny radioactive elements (radon progeny) that can lodge in the lining of the lungs, where they can give off radiation. This radiation can damage lung cells and eventually lead to lung cancer.

Cigarette smoking is by far the most common cause of lung cancer in the United States, but radon is the second leading cause. Scientists estimate that about 20,000 lung cancer deaths per year are related to radon.

Exposure to the combination of radon gas and cigarette smoke creates a greater risk for lung cancer than either factor alone. Most radon-related lung cancers develop in people who smoke. However, radon is also thought to cause a significant number of lung cancer deaths among people who don't smoke in the United States each year.

Some studies have suggested that radon exposure may be linked to other types of cancer as well, such as childhood leukemia. But the evidence for such links has been mixed and not nearly as strong as it is for lung cancer. Because radon and its progeny are absorbed mainly by inhaling, and because the radiation they give off travels only a short distance, it is unlikely that radon would affect other tissues in the body.

The evidence that radon causes lung cancer comes from studies in people and studies done in the lab.

Studies in people

Several types of studies in people have found that exposure to radon increases lung cancer risk:

- Studies of people working in underground mines with high levels of radon exposure
- Studies comparing radon levels in homes of people with lung cancer with the levels in homes of similar people without lung cancer
- Studies comparing lung cancer cases or deaths in areas with differing levels of radon exposure

These studies also show that the overall risk of lung cancer from radon is even higher in people who smoke and people who used to smoke.

Some long-term studies of uranium miners have found that they had higher risks of certain other cancers. But since the people with the higher risk weren't exposed to higher amounts of radon and radon progeny, it isn't clear that radon is the cause of those cancers. They may instead be linked to uranium dust or other exposures in the mines.

Studies done in the lab

Studies in lab animals have also shown an increased risk of lung cancer with exposure to radon. These studies revealed that breathing in radon and its progeny increases the risk of lung tumors. The risk is higher if the animal breathes in both cigarette smoke and radon. In some animals, the risk of certain other cancers was also increased.

In lab studies using human cells, radon and its progeny have also been shown to cause damage to chromosomes (packets of DNA) and other types of cellular damage. These types of changes are often seen in cancer cells.

Can I avoid being exposed to radon?

Radon is in the air we breathe, both indoors and out, so it isn't possible to avoid it completely. But there may be things you can do to lower your exposure. For most people, the largest potential source of radon exposure is in their home. You can check radon levels in your home to determine if you need to take steps to lower them. Do-it-yourself radon detection kits are available from your health department and from the MSU Extension offices included in the table listed [here](#). Radon test kits can also be found at local hardware stores, home improvement centers, and other retail stores, or you can purchase them online directly from the manufacturer at www.mi.radon.com. To locate a professional testing service, please refer to the [Radon Testing and Mitigation Contractors Web page](#) or call 800-RADON GAS (800-723-6642).

Short-term kits are usually left in place for several days before being mailed. Long-term kits, which may give a more accurate assessment of average radon levels over the course of a year, are usually left in place for at least 3 months. The EPA recommends testing all homes below the 3rd floor, even new homes that were built "radon-resistant."

The EPA recommends taking steps to lower radon levels if test results show levels of 4.0 pCi/L or higher. This value refers to the annual average. If you are using a do-it-yourself test, the EPA recommends using a short-term kit first. If the test result is 4.0 pCi/L or higher, do a follow-up test with either a long-term or short-term kit to be sure. If the result is still high, you should take steps to fix the problem.

A variety of methods can be used to reduce radon levels in your home, such as sealing cracks in floors and walls or increasing ventilation through "sub-slab depressurization" using pipes and fans. The EPA recommends that you have a qualified contractor fix your home because lowering high radon levels requires specific technical knowledge and special skills. Without the proper equipment or technical knowledge, you could actually increase your radon level or create other potential hazards and additional costs. If you decide to do the work yourself, be sure you have the proper training and equipment. Certain building materials may be more "radon tight" and may help reduce exposure in areas where radon levels are high. The [National Radon Proficiency Program](#) or the [National Radon Safety Board](#) both maintain a list of certified contractors on their websites at www.nrpp.org and www.nrsb.org. A list of certified contractors can also be obtained from your local health department, or by calling the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Indoor Radon Program at 800-RADON GAS (800-723-6642).

What should I do if I've been exposed to radon?

There are no widely available medical tests to measure whether you have been exposed to radon. If you smoke and have been exposed to higher levels of radon, it's very important to try to quit smoking. The combined effects of cigarette smoking and radon exposure raise the risk of lung cancer much more than either exposure alone.

If you think you might have been exposed to high levels of radon over long periods of time, talk with your doctor about whether you should get regular health checkups and tests to look for possible signs of lung cancer. Be aware of possible symptoms of lung cancer, such as shortness of breath, a new or worsening cough, pain or

tightness in the chest, hoarseness, or trouble swallowing, and tell your doctor if you start to have any of these symptoms.

Recommendations:

1. Test your home for radon. Testing is recommended every two years because homes settle, new cracks form in the foundation and radon levels can change.
2. If your radon levels are elevated at or above 4 pCi/L, you should confirm those levels with a follow-up test. If the test results are confirmed, you should take action to reduce exposure to radon. See more information at the EGLE website here: https://www.michigan.gov/egle/0,9429,7-135-3312_4120_4196-485693--,00.html.
3. If you smoke, work on quitting. Smoking is the leading cause of lung cancer, and the number one cause of preventable death. Radon exposure with smoking is a very big risk for cancer. The [Michigan Tobacco Quitline](#) offers free information, tobacco treatment referral, online program, and text-messaging 24 hours a day, seven days a week, at 1-800-QUIT-NOW (1-800-784-8669) in English or 1-855-DÉJELO-YA (1-855-335-3569) in Spanish. Other resources and tips for [How to Quit Tobacco](#) are also available.