VERMONT
DEPARTMENT OF HEALTH

Radon in Your Home

What is radon?

Radon is a naturally occurring radioactive gas that has no color, odor or taste. Unless you test for it, there is no way of knowing if radon is present in your home. Radon results from the decay of uranium—a radioactive element found naturally in the earth's crust. Over billions of years, uranium decays into radium, and eventually, radon.

How does radon enter a home?

Radon may be present in both soil and water. Soil is the most common source of radon in your home.

Radon in air: Since radon is typically found in soil, it moves up through the ground and into the air of your home through cracks in the foundation. Homes can act like large chimneys, with warm air rising and escaping out upper floor windows and through cracks in the attic. This creates a vacuum at the lowest level of the home, which can pull in radon from the soil.

Radon in water: Well water that contains radon may also increase the level of radon in indoor air. Activities like taking showers, doing laundry or running the dishwasher can release radon dissolved in water into the air.

The amount of radon in a home depends on many factors including geology, construction, mechanical systems and the way the building is used.

High levels of radon have been found in all types of homes in every area of Vermont. The likelihood of a radon problem cannot be predicted by the style, age, or location of a home.

What are the health effects of being exposed to radon in a home?

There are no known health effects associated with brief exposure to radon. However, over longer periods of time, breathing air with too much radon increases a person's risk of getting lung cancer. If you smoke and your home has high levels of radon, your risk of getting lung cancer is especially high.

Radon is the leading cause of lung cancer among non-smokers. According to a report by the National Academy of Sciences, radon is estimated to cause between 15,000 and 22,000 lung cancer deaths per year in the United States.

Over a lifetime, ingesting radon in water also poses a risk of stomach cancer. However, the major danger posed by radon in water is the risk of lung cancer when radon escapes from the water and is inhaled. The risk of stomach cancer due to drinking water with high levels of radon is small compared to the risk of lung cancer from breathing air that has high levels of radon.

How do I test my home for radon?

Testing for radon is the only way of knowing whether it is present in your home. High radon levels in air cause more of a health risk than radon in water. If your water comes from a private well, testing water, as well as air, may help you determine the most effective way to reduce radon levels in your home.

Testing for radon in air: The use of a long-term radon in air test kit is best. A test period of 3 to 12 months (ideally including a heating season) is recommended since radon levels can change daily, weekly and seasonally. Longer test periods give the best measure of long-term exposure. Free long-term radon in air test kits are available to Vermont residents from the Health Department.

Published September 2016

Additionally, 6-month and 12-month long-term radon in air test kits can be purchased from the Health Department Laboratory.

Vermont law does not require a radon in air test as part of a real estate transaction. For real estate transactions or other cases where a quick test is needed, the Health Department Laboratory, private labs, hardware stores and building supply stores sell short-term radon in air test kits. If you are using short-term radon in air test kits, the Environmental Protection Agency (EPA) recommends using two testing devices, placed side-by-side. Short-term radon in air test kits purchased from the Health Department Laboratory come as a pair so the devices can be placed side-by-side.

Testing for radon in well water: Because radon concentrations in well water can vary throughout the year, it can be beneficial to test more than once at different times of the year. Radon in water test kits can be ordered from the Health Department Laboratory.

What does the radon test result mean?

Air: Radon can be found in the air both inside and outside your home. In Vermont, the average radon level in indoor air is about 2.0 picocuries per liter (pCi/L), while the national outdoor air level is about 0.4 pCi/L. The EPA sets the radon action level at 4.0 pCi/L. If your radon in air test result is at or above 4.0 pCi/L, we recommend contacting a certified radon mitigation contractor to help reduce radon levels in your home. If your radon in air test result is between 2.0 and 4.0 pCi/L, both the EPA and the Health Department recommend considering mitigation since radon levels in this range can still increase the risk of lung cancer.

If your radon in air levels are at or above the action level, and your water comes from a well, testing your water for radon may help you in determining the most effective way to reduce radon in air levels in your home. Sometimes water contributes a significant amount of radon to the air in a home and needs to be treated.

Water: The Health Department has set an advisory level for radon in water of 4,000 pCi/L. If the result of the radon in water test is less than 4,000 pCi/L, you do not need to treat your water, but test your water again in 5 years. If your radon in water result is at or above 4,000 pCi/L, consider treating your water. In addition, if you have tested for radon in water, but have not yet tested your home for radon in air, test for radon in air.

About 10,000 pCi/L of radon in water will increase the radon level in air by 1.0 pCi/L. Breathing radon in air poses more of a health risk than drinking radon in water.

If you have tested both your indoor air and your water for radon, using the Radon Contribution Calculator (found here: http://healthvermont.gov/enviro/rad/Radon.aspx#result) may help you estimate how much of the radon in air is due to radon in the water supply and how much is due to air entering the home through the foundation.

How can I fix a radon problem (mitigation)?

Air: Generally, the best way to reduce the levels of radon in air is to install a sub-slab depressurization system. In most cases, this system involves drilling a hole in the basement floor and installing a vent pipe and a fan to reduce radon entry into the home. Sealing holes and cracks in the foundation is an important part of a mitigation system, but has not been proven to lower levels significantly or consistently when only this strategy used.

Published September 2016

The cost for installing a radon in air mitigation system can vary depending on the type of house and the choice of system. Estimated cost: $800 to $2,500.

Contact the Vermont Radon Program for a list of certified radon in air mitigation contractors based in Vermont, or visit: http://aarst-nrpp.com/wp/database-search/

NOTE: The State of Vermont does not license or endorse radon mitigation professionals. These radon mitigation contractors are certified through their respective professional organizations.

Water: Two types of water treatments systems can be installed to remove radon in water:

- *Aeration system:* An aeration system uses a fan to reduce radon in water. This system mixes your water with air inside a tank and then vents the air and radon outdoors, away from the house. Estimated cost: $5,000 to $7,000.
- *Granular Activated Carbon (GAC):* This filtration system uses a charcoal filter to remove the radon from the water. The Health Department discourages the use of GAC systems to remove radon because the radon collected on the filter can pose a radiological hazard to both the homeowner and the technicians who service the system. Estimated cost: $800 to $1,700.

There is not currently a certification for radon in water mitigation. Contact water treatment companies and/or licensed plumbers for more information on services provided.

Where can I get more information?

Contact the **Vermont Radon Program**:

- Call: (800) 439-8550
- Email: radon@vermont.gov
- Visit: http://healthvermont.gov/enviro/rad/Radon.aspx

From the **Environmental Protection Agency** (http://www.epa.gov/radon):

- "A Citizen's Guide to Radon" http://www.epa.gov/radon/pubs/citguide.html
- "Home Buyer's and Seller's Guide to Radon" http://www.epa.gov/radon/pubs/citguide.html
- "Consumer's Guide to Radon Reduction" https://www.epa.gov/radon/consumers-guide-radon-reduction-how-fix-your-home

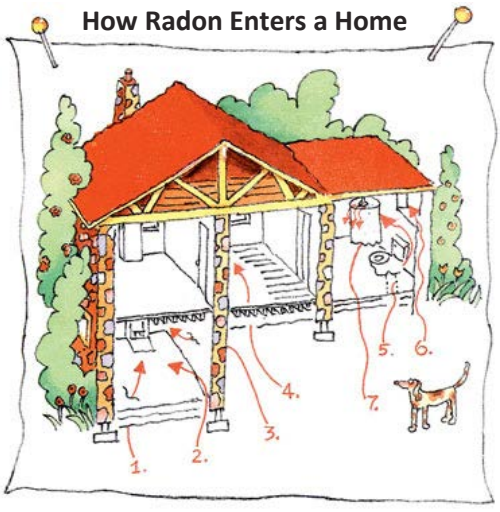
Where can I get radon test kits from the Health Department?

*For free **long-term radon in air** test kits:*

- Call: (800) 439-8550 (toll free in Vermont). For TTY/TDD, dial 711 for relay service.
- Email: radon@vermont.gov (Please put "Radon Test Kit" in the subject line of your email and be sure to include your name and Vermont mailing address.)

*To purchase a pair of **short-term radon in air** test kits or a **6-month or 12-month long term radon in air** test kit:* call the Vermont Department of Health Laboratory at (802) 338-4736 or (800) 660-9997 (toll free in Vermont).

*To purchase a **radon in water** test kit:* call the Vermont Department of Health Laboratory at (802) 338-4736 or (800) 660-9997 (toll free in Vermont).



Radon moves from the soil and into your home through cracks and openings in the foundation and from the water supply.

Published September 2016