



### What is radon and where does it come from?

Radon is a gas that comes from the radioactive decay of radium in the soil. Radon is a colorless, tasteless and odorless gas that can only be measured through the use of proper test procedures.

Radon is constantly being generated by the decay of radium. Radium is the decay product of uranium, which is commonly found in rocks and soils present in the earth's crust. The concentration of radon gas in the soil will be related to the amount of uranium present. However, this is not a good indicator of the level of radon that may be in an individual home. The radon concentration in a home is dependent on many factors, including the types and properties of the soil that the home is built on and the individual features of the building.

Radon can also be dissolved in ground water and can be introduced into the indoor air through the aeration of well water during its use in washing machines, showers, and so forth. However, in New York State, with a few exceptions, this component is usually relatively small compared to the amount of radon entering the home from the soil.

### What are the health effects of radon?

Based on data provided by the United States Environmental Protection Agency (EPA), the Surgeon General has warned that radon is the second leading cause of lung cancer in the United States, resulting in an estimated 22,000 lung cancer deaths annually. Many homes contain radon concentrations that are high enough to give their occupants lifetime exposures that could increase their risk of developing lung cancer. As one inhales, radon decay products in the inhaled air are deposited in the lungs. Radon and its decay products emit alpha and beta particles and gamma photons. The alpha particles are very damaging if emitted from radioactive material within the body. The alpha particles can strike sensitive lung tissue causing damage to the cells in the lungs and increase the risk of lung cancer. The risk associated with exposure to radon is thought to increase along with increasing radon concentration, so the higher the average radon level is in a house, and the longer the exposure period, the greater the risk to the occupants.

In addition, if you are a smoker, radon greatly increases your risk of lung cancer.

### RADON RISK\*

Radon Level**	If 1,000 people who smoked were exposed to this level over a lifetime...	If 1,000 people who never smoked were exposed to this level over a lifetime...
20 pCi/L	About 135 people could get lung cancer	About 8 people could get lung cancer
4 pCi/L	About 29 people could get lung cancer	About 2 people could get lung cancer
0.4 pCi/L	About 3 people could get lung cancer	Less than 1 person could get lung cancer

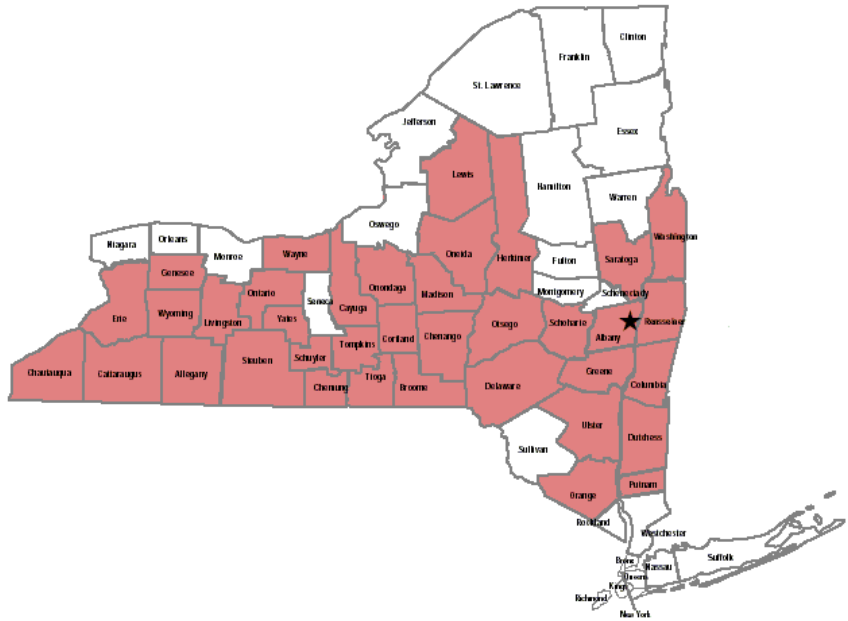
\* The risk of exposure to radon in addition to other causes.

\*\* Radon concentration in air is measured in units of "picoCuries per Liter (pCi/L)." The picoCurie (pCi) is a unit of radioactivity which represents one trillionth of a Curie or 2.22 nuclear-transformations per minute.

## Do I live in an area designated as a "high radon risk area" by the United States Environmental Protection Agency and New York State?

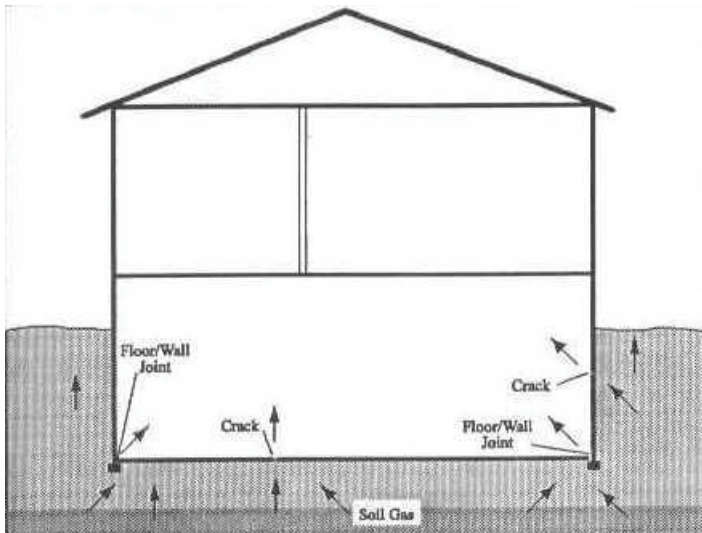
Thirty-seven (37) counties in the state have been designated as "high radon risk areas" by the EPA and New York State. They are as follows (shaded on the map):

- |             |            |
|-------------|------------|
| Albany      | Oneida     |
| Allegany    | Onondaga   |
| Broome      | Ontario    |
| Cattaraugus | Orange     |
| Cayuga      | Otsego     |
| Chautauqua  | Putnam     |
| Chemung     | Rensselaer |
| Chenango    | Saratoga   |
| Columbia    | Schoharie  |
| Cortland    | Schuyler   |
| Delaware    | Steuben    |
| Dutchess    | Tioga      |
| Erie        | Tompkins   |
| Genesee     | Ulster     |
| Greene      | Washington |
| Herkimer    | Wayne      |
| Lewis       | Wyoming    |
| Livingston  | Yates      |
| Madison     |            |



## How can radon enter my home?

Radon can enter a home whether it is old or new, or whether it has a basement or is on a slab. Radon enters homes through cracks in slabs or basement floors and walls, and through openings around sump pumps because of a difference in pressure. Heating, ventilation or air-conditioning systems may create a negative pressure that can draw radon into the building. The major routes of entry into a home in New York State are illustrated in the figure.



## How can I test the radon levels in my home?

Testing for radon is simple and inexpensive. You can test your home any time, although it's better to do so during the heating season when the home is less ventilated. Remember that the longer you wait, the longer you and your family may be exposed to radon.

Test kits can be purchased in many hardware stores, the hardware sections of discount outlets, from local health departments, or from the New York State Department of Health (NYSDOH). The kits should display the phrase "Meets EPA or National Radon Proficiency Requirements."

There are two categories of detectors: long-term (90 days to one year) and short-term (less than 90 days, typically 2 to 7 days). The length of testing varies depending on the type of radon information you are interested in. Short-term tests are useful for screening and for situations

where results are needed quickly. A long-term test will usually be a better indicator of the radon level in your home. Since the long-term test occurs over a longer period of time, the influence of daily and seasonal fluctuations in your home's radon level will be reduced. A long-term test will provide a true annual average. "Alpha track" and "electret" detectors are commonly used for this type of testing. Long-term test kits cost about \$30, and are accurate to within plus or minus 25%.

The most commonly used device for making short-term radon measurements in homes is the charcoal canister. These devices are fairly quick, inexpensive, and easy to use. Their accuracy is about plus or minus 20%. Since short term tests can be affected by daily and seasonal fluctuations in your home's radon level, the NYSDOH recommends that the average of two charcoal canister measurements be used before making a decision to take appropriate corrective action. Short-term charcoal canisters are available from the NYSDOH at a cost of \$6.75 per detector ordered (New York State Residents ONLY). To obtain an order form, please visit the NYSDOH website at <http://www.health.state.ny.us/nysdoh/radon/detector.pdf> or call 1-800-458-1158, ext. 2-7556.

Continuous electronic radon monitors may also be used for short-term measurements (often for real estate transactions). They should only be used by certified professional radon testing firms. Tests using these monitors are more expensive (about \$100). To obtain the names of certified professional radon testing firms, contact the NYSDOH's Radon Program, the National Radon Safety Board's web site (NRSB; [www.nrsb.org](http://www.nrsb.org)), the National Environmental Health Association's web site (NEHA; [www.neha.org](http://www.neha.org)), or the NYSDOH's Environmental Laboratory Approval Program web site ([www.wadsworth.org/labcert/elap/radon.html](http://www.wadsworth.org/labcert/elap/radon.html)).

### **What is the recommended action level for radon?**

The NYSDOH and the EPA use 4 pCi/L as a recommended action level. When testing indicates that the radon level in the lowest primary living area of the home is above this action level, the NYSDOH recommends that the homeowner take appropriate corrective action.

### **How can I reduce the radon levels in an existing house?**

Radon levels in a house can be reduced. This can be done by several methods, including sealing cracks in floors and walls. One of the most widely used methods is the active sub-slab depressurization system. This technique will reroute the radon gas from the soil away from the house, by using a fan to create a pressure that will move the soil gas from beneath the basement to a point above the roof. This technique is very effective and will typically cost between \$1,000 and \$1,500 to install. There are contractors in most areas of the state who have met certain requirements and are trained to identify and fix radon problems in your home. To obtain the names of local contractors, contact the NYSDOH's Radon Program at 1-800-458-1158, extension 2-7556, or visit the NRSB's web site or NEHA's web site.

### **What types of radon reduction techniques are available for new construction?**

If you are building in an area known to have a high probability of elevated radon levels, there are certain steps that can be taken during construction that will reduce the radon levels. EPA's *Model Standards and Techniques for Control of Radon in New Residential Buildings* and *Building Radon Out: A Step-by-step Guide on How to Build Radon Resistant Homes* (both available on EPA's web site) contains information on how to incorporate these techniques and materials in residential construction. Essentially this will consist of a layer of semi-permeable material, such as sand or gravel, under the foundation, a 6 mil or thicker layer of plastic between the gravel under the foundation and the concrete, a 4" PVC pipe through the foundation floor and extending through the roof, a roughed in electrical box in the attic or loft near the PVC pipe, and sealing and caulking of all openings in the concrete floor.

**Where can I get more information?**

For more information about radon or radon testing, or to obtain the names of local contractors, contact the NYSDOH's Radon Program at 1-800-458-1158, extension 2-7556.

**Email:**

radon@health.state.ny.us

**Web sites:**

<http://www.health.state.ny.us/nysdoh/radon/radonhom.htm>

<http://www.wadsworth.org/labcert/elap/radon.html>

<http://www.epa.gov/iaq/radon>

<http://www.nrsb.org>

<http://www.neha.org>