

Radon

Publication adapted from Radon: What the Public and Policy Makers Need to Know by the Clean Indoor Air Partnership of the University of Kentucky College of Nursing



WHAT IS RADON?

- Radon is a naturally occurring radioactive soil gas that is colorless, odorless and tasteless.¹
- Through decay, radon breaks down into hazardous particles which can be inhaled.¹
- Radon levels are measured by units of radioactivity per volume of air called picocuries per liter (pCi/L).³

HOW DOES RADON AFFECT HEALTH?

- Radon is a form of ionizing radiation and known to cause cancer in humans.⁷
- Radon decays into sticky radioactive particles that get trapped in the lungs when inhaled. As they are broken down further, these particles release small bursts of energy that damage lung tissue over time.⁷
- Radon exposure is the second leading cause of lung cancer, second only to cigarette smoking.²
- Living in a home with a radon level of 4 pCi/L is like getting 200 chest x-rays per year.⁷
- Living in a home with a radon level of 20 pCi/L is like smoking two packs of cigarettes per day.⁷

WHO IS AFFECTED?

- Radon is linked to 15,400 to 21,800 lung cancer cases in the United States each year.⁴ It is estimated that between 3-14% of the total lung cancer cases are linked to radon.¹
- If you smoke and/or are exposed to secondhand smoke and your home or workplace has high levels of radon, the risk of getting lung cancer is especially high.⁸
- The average radon concentration in the indoor air of America’s homes is about 1.3 pCi/L.³
- Nationally, approximately 7% of homes test at 4 pCi/L or above.³ In Northern Kentucky, 19% of homes tested were at or above 4 pCi/L in 2000-2004.

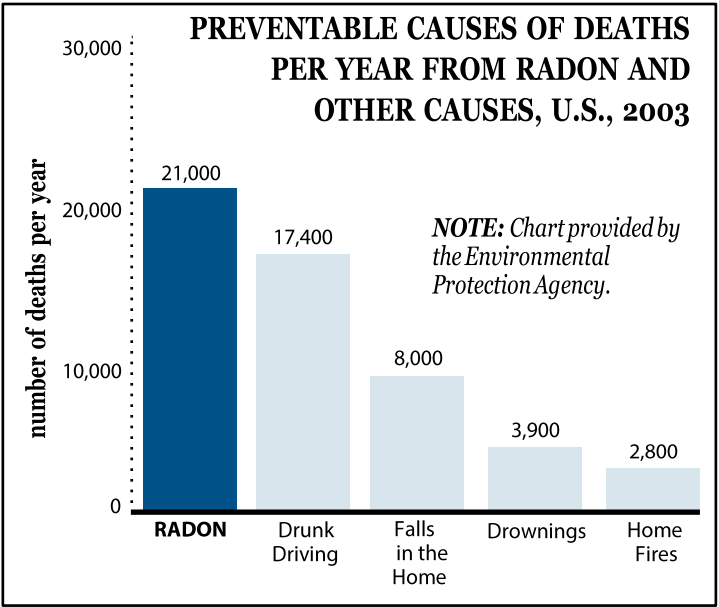
SMOKING AND RADON

If exposed to 4 pCi/L of radon over a lifetime, 7 per 1,000 of those who never smoked would develop lung cancer versus 62 per 1,000 smokers.³

Among never-smokers, radon exposure may be more harmful for those exposed to secondhand smoke.⁹ Secondhand smoke particles linger in the air and are small enough to be inhaled directly into the lungs. The combination of radon attached to the fine particles from secondhand smoke greatly increases the likelihood of lung cancer. This combination makes it easier to breathe in the particles and easier for those particles to stick to the lungs.³

WHERE IS RADON FOUND?

- Radon is found outside and indoors.
- Outdoor levels are typically well below the EPA’s recommended action level of 4 pCi/L.
- Radon can enter any type of building - homes, offices, and schools - through cracks in the basement or foundation.³
- The majority of radon exposure occurs in homes where people spend most of their time.



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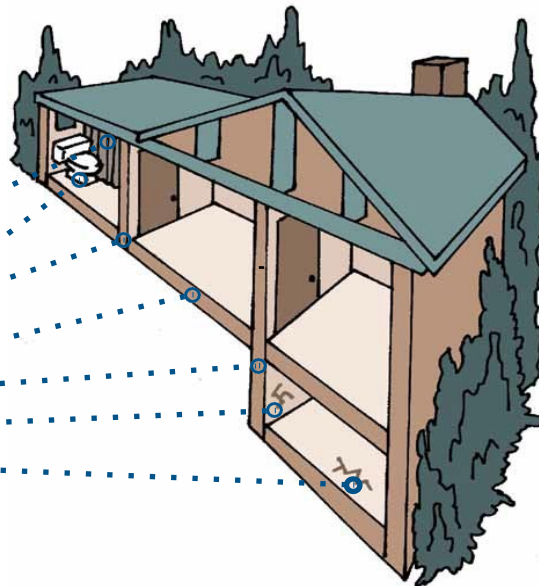
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Disabilities accommodated with prior notification.

RADON GETS IN THROUGH

- The water supply
- Gaps around service pipes
- Construction joints
- Gaps in suspended floors
- Cavities inside walls
- Cracks in walls
- Cracks in solid floors



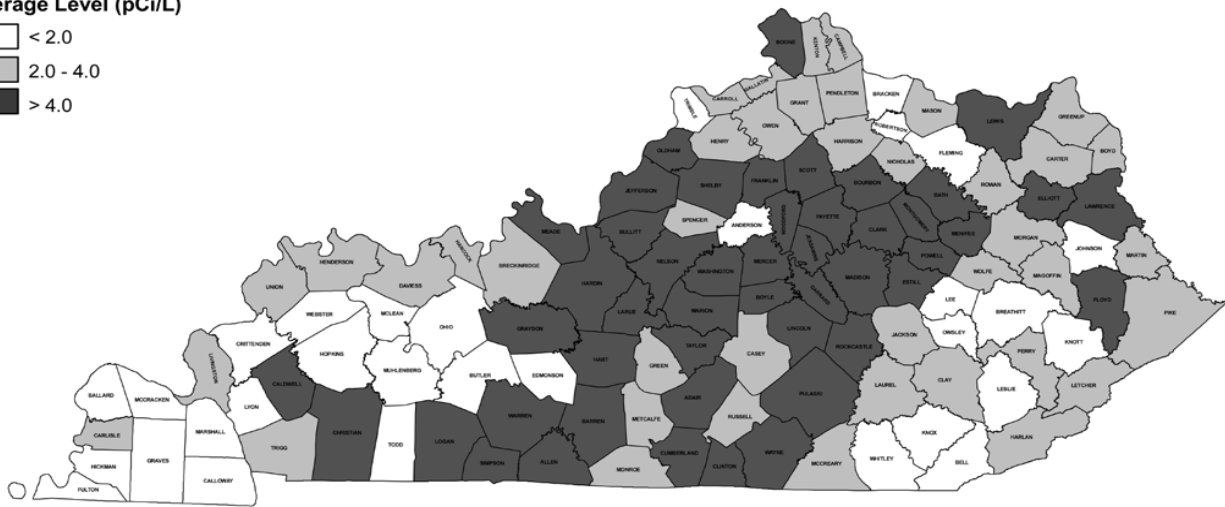
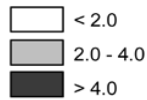
RADON LEVELS IN KENTUCKY

The map shows the average radon levels from radon test kits collected in each Kentucky county. Dark gray indicates a high risk for a potential radon problem. Light gray indicates a moderate risk for a potential radon problem. White indicates a low risk for a potential radon problem.

There is no guarantee that your home radon levels are similar to the average for your county. Residents should test their homes to determine if they have a radon problem, no matter the level of risk in the county. Homes should be mitigated if they test at 4 pCi/L or higher.³

AVERAGE RADON LEVELS BY COUNTY, KENTUCKY

Average Level (pCi/L)



Notes:

The amount of radon in the air is measured in "picocuries per liter of air" or "pCi/L". The risk of contracting lung cancer from radon depends on how much radon is in your home, the amount of time you spend in your home, and whether you are a smoker or have ever smoked. The EPA recommends to take action to reduce radon in your home if the level is 4 pCi/L or higher. Even radon levels below 4 pCi/L pose some risk because there is no safe level of radon.

Source: EPA, "A Citizen's Guide to Radon", January 2009

Source of Radon Data: Kentucky Radon Program, 1998-2008

Source of GIS Data Layers: Kentucky Geological Survey

GIS Completed by WKU Department of Environment, Health and Safety



WHY SHOULD HOMES AND OTHER BUILDINGS BE TESTED FOR RADON?

- Testing homes is cost-effective and easy.³
- Schools and offices may also contain radon, and need to be tested.
- The 1988 Indoor Radon Abatement Act requires testing of schools and federal buildings, but such testing rarely takes place.¹⁰

HOW DO I KNOW IF I HAVE A RADON PROBLEM?

- The only way to know whether your home has high radon exposure levels is to test your home.
- The EPA recommends homes be fixed if the radon level is 4 pico curies per liter of air (pCi/L) or higher.
- Because there is no known safe level of exposure to radon, the EPA recommends that Americans consider fixing their homes for radon levels between 2.0 pCi/L and 4.0 pCi/L.³

WHO PROVIDES RADON INFORMATION AND TESTING/MITIGATION?

- Many local health departments have radon programs and provide free radon test kits.³ Find the list of county radon coordinators at <http://chfs.ky.gov/dph/info/phps/Radon+County+Information.htm>.
- The Kentucky State Radon program offers free radon test kits if there is not a county radon program: <http://chfs.ky.gov/dph/info/phps/radongas.htm> or (502) 564-4856.
- Radon test kits can be purchased at local home improvement stores for \$15-\$25.
- Radon testing and mitigating requires technical knowledge and special skills. It is recommended that only certified mitigation professionals test and mitigate for radon.³ Visit <http://www.radongas.org> for a list of certified testers/mitigators.
- Note: Kentucky has a state law requiring radon professionals to be certified, but as of December 2009, there were no regulations to guide the certification process.

CAN RADON BE PREVENTED WHEN BUILDING A NEW HOME?

- Yes. Home builders can help prevent radon exposure before it starts by adding a Radon Resistant New Construction (RRNC) passive system during construction. This system can be easily activated by a certified mitigator if high radon levels are found in the home.
- RRNC costs approximately \$600-\$800 for a single family home, compared to \$1,200 to \$2,500 for mitigation of an existing home.

WHY HIRE A CERTIFIED RADON PROFESSIONAL?

- A typical handyman cannot properly install a radon mitigation system.
- A certified radon professional can advise you on which radon reduction system is appropriate for your home or building.
- EPA recommends selecting a contractor who is nationally certified to test and mitigate for radon.
- Many states have training programs to certify radon professionals.
- There are national certification programs that follow established EPA protocols.

A NOTE ON SHORT-TERM OR LONG-TERM TESTING:³

There are two general ways to test for radon. Short-term testing lasts two (2) to ninety (90) days, depending on the device. Charcoal canisters, continuous radon monitors, and liquid scintillation are the most common short-term testing devices. Long-term testing lasts for more than ninety (90) days. Alpha track and electrets detectors are the most common long-term testing devices. Because radon levels tend to vary from day to day and season to season, a short-term test is less likely than a long-term test to yield a year-round average radon level.

EPA RECOMMENDS THE FOLLOWING:

1. Conduct a short-term test. If the result is equal to or greater than 4.0 pCi/L, conduct a follow-up test.
2. For the follow-up test, use either a long-term test or a second short-term test. For better understanding of the annual average, use long-term testing. If the first short-term test result is more than twice EPA's 4.0 pCi/L action level, a second short-term test should be conducted immediately.
3. If a follow-up short-term test is conducted, average the results of both short-term tests. If the results are equal to or greater than 4.0 pCi/L, EPA recommends mitigation. If a long-term test was conducted as follow-up and the results are equal to or greater than 4.0 pCi/L, EPA recommends mitigation.

HOW TO CHOOSE THE RIGHT RADON PROFESSIONAL?

- Ask for references
- Require proof of certification, including agreement to follow protocols and codes of ethics
- Ask for proof of insurance including workers' compensation
- Ask for a concise contract

WHAT DOES THE OPPOSITION SAY ABOUT RADON?

There are groups who work against state radon regulations and policies. They support maintaining statewide preemption so that local communities do not have the option to propose and implement radon safety measures. By proposing weak, ineffective or no radon policies, opponents perpetuate the myth that radon is not really harmful and they argue that no more needs to be done to reduce the harms from radon.

ARE SCIENTISTS SURE THAT RADON IS A REAL HEALTH PROBLEM?

PUBLIC HEALTH RESPONSE: Yes. The debate is over. All major health organizations (e.g., U.S. Surgeon General, Centers for Disease Control and Prevention, World Health Organization, EPA, American Lung Association, and American Medical Association) agree that radon causes thousands of preventable lung cancer deaths every year. The EPA estimates that approximately 2,900 radon-induced, lung cancer deaths occur each year among never-smokers.

HOW DO I KNOW IF I HAVE A RADON PROBLEM?

PUBLIC HEALTH RESPONSE: Radon testing is easy and reliable. You can test your home yourself or hire a qualified radon test company. Either approach is easy and quick. Free radon test kits are available through the state radon program or your local health department. You can also buy a test kit at hardware or home improvement stores for \$15-\$25 or hire a qualified radon testing professional for about \$100.

CAN HOMES WITH RADON PROBLEMS BE FIXED?

PUBLIC HEALTH RESPONSE: Yes. There are simple, easy solutions to radon. Hundreds of thousands of homeowners have already fixed radon in their homes. Radon levels can be readily lowered for \$1,200 to \$2,500. It costs only \$600-800 to fix the problem before it starts by building with radon resistant construction materials.

DOES RADON ONLY AFFECT CERTAIN KINDS OF HOMES, WORKPLACES, AND SCHOOLS?

PUBLIC HEALTH RESPONSE: No. Radon can be a problem in homes of all types: old homes, new homes, drafty homes, insulated homes, homes with basements, and homes without basements. Local geology, construction materials, and how the home or building was constructed can affect radon levels.

IS RADON ONLY A PROBLEM IN CERTAIN PARTS OF THE COUNTRY?

PUBLIC HEALTH RESPONSE: No. High radon levels are found in every state. While radon problems vary from area to area, the only way to know your radon level is to test.

IS A NEIGHBOR'S TEST RESULT A GOOD INDICATION OF WHETHER YOUR HOME HAS A PROBLEM?

PUBLIC HEALTH RESPONSE: No. A neighbor's test result is not a good indication of whether your home has radon. Radon levels can vary greatly from home to home. The only way to know if your home has a radon problem is to test.

SHOULD EVERYONE TEST THEIR WATER FOR RADON?

PUBLIC HEALTH RESPONSE: No. It is important to first test the air in the home for radon. Radon can enter the home through water. If your water comes from a public water supply that uses ground water, call your water supplier. If high radon levels are found in the home and there is a private well, call the Safe Drinking Water Hotline at 1 800-426-4791 for information on testing your water.

IS RADON FOUND IN GRANITE?

PUBLIC HEALTH RESPONSE: Some types of granite may emit gamma radiation above typical background levels. However, at this time EPA believes that the existing data is insufficient to conclude that the types of granite commonly used in countertops result in significantly increased indoor radon levels. The principal source of radon in homes is from the soil in contact with basement floors and walls. To reduce the radon risk, you should first test the air in your home.

IS IT DIFFICULT TO SELL A HOME WHEN IT HAS TESTED HIGH FOR RADON?

PUBLIC HEALTH RESPONSE: When radon problems are fixed, home sales are not affected. The added protection of mitigation may be a selling point. Kentucky law requires the seller to disclose if the home has ever been tested for radon.

IS IT TOO LATE TO TAKE ACTION SINCE I'VE LIVED IN MY HOME AND WORKED IN MY WORKPLACE FOR SO LONG?

PUBLIC HEALTH RESPONSE: It is never too late to test for radon! You will reduce your risk of lung cancer when you reduce radon levels, even if you've lived with a radon problem for a long time.

CAN A SHORT-TERM TEST BE USED FOR MAKING A DECISION ABOUT WHETHER TO FIX YOUR HOME?

PUBLIC HEALTH RESPONSE: A short-term test, followed by a second short-term test can be used to decide whether to fix your home. When using a short-term test, it is necessary to follow the directions carefully. For example, if you conduct a short-term test while your windows are open, you will not get accurate results. Long-term tests are also available and give an accurate read of radon levels in your home throughout a 9-12 month period.

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