

Resources for radon education and outreach

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Abstract

Radon is a serious health issue for American households – it is the second leading cause of lung cancer after smoking. Fortunately, it is easy to test for radon in the home, and it is relatively inexpensive to install systems to reduce radon if the test shows that levels are high. Educational resources on radon are abundant, including information from Cooperative Extension, such as Healthy Indoor Air for America's Homes, and from the U.S. Environmental Protection Agency. The present article provides a peer review of these resources and offers suggestions for developing, marketing, and implementing a radon workshop.

Keywords: radon, indoor air quality, educational workshop

Introduction

Radon is a colorless, odorless, radioactive gas emitted from uranium, a naturally occurring mineral in rocks and soil. Radon becomes a concern when it seeps through openings such as

cracks, loose-fitting pipes, sump pits, dirt floors, slab joints, or block walls and accumulates in the home. Air pressure inside the home is usually lower than pressure in the soil around the foundation of a house. Because of the difference in pressure, a house acts like a vacuum, drawing radon in through foundation cracks and other openings.

Radon has been implicated as a risk factor in the development of lung cancer. Radon gas decays into radioactive particles that can become trapped in the lungs. These particles release bursts of energy that can damage lung tissue and lead to lung cancer. Radon is the second leading cause of lung cancer and is associated with about 20,000 lung cancer deaths per year in the United States.

Given that radon levels are influenced by a variety of factors such as soil type and moisture, the only way to know if a home has elevated levels of radon is to test it. Measuring radon levels in the home is simple and inexpensive. Test (detection) kits include instructions and return postage for mailing samples back to a lab for analysis. Short-term detectors (such as charcoal canisters) are used for two to seven days. Long-term detectors (such as alpha track detectors) are left in place for three months to one year. Test kits are available for purchase, typically from hardware and home improvement stores.

The cost of repairs to reduce radon depends on how a home was built and the extent of the radon problem. The most commonly used radon mitigation technique, and generally the most effective method, is sub-slab depressurization. With this system, pipes extend from a permeable layer below the basement floor (such as gravel or drain tiles) upward through the structure, venting out the roof. This system allows radon gas to be collected before it enters the house and funnels it directly up through pipes and out of the home. If natural ventilation through the pipe system is not adequate to lower radon levels, a fan can be added in the attic to help draw gases through the system to the outdoors.

Radon reduction methods can be planned for and installed during the construction of a new house. Installation costs are generally much lower during construction, and careful planning allows integration of a variety of strategies, ensuring the most effective radon reduction system possible. The system might include a passive sub-slab or crawlspace depressurization system; foundation barrier techniques such as a layer of gas-permeable material under the foundation (usually four inches of gravel), plastic sheeting (6ml) over that material, and sealing and caulking of all openings in the concrete foundation floor or the floor above; and a dedicated intake and/or combustion air for exhaust and combustion appliances.

A radon fact sheet is a good introductory educational resource. Many states have developed fact sheets for consumers in print or on Cooperative Extension Web sites (for example, see *Radon in the Home*, www.ext.colostate.edu/pubs/consumer/09953.pdf, and *Testing Your House for*

Radon, www.ces.ncsu.edu/depts/fcs/pdfs/insite1.pdf). The radon fact sheets follow a similar format that can form the basis of a workshop:

- Description of what radon is, where it comes from, and its health risk.
- Radon testing using short-term detectors and long-term detectors. Information is provided on how to purchase and use test kits.
- Understanding test results, especially the way radon is measured and what levels mean.
- Radon mitigation, including methods, costs, and selection of a radon mitigation provider.
- Radon-resistant new construction.
- Issues for home buyers and renters, suggesting that they ask if the home has been tested for radon and what the test results showed.

It is recommended that a radon fact sheet be given to workshop participants for later reference. Additionally, a free test kit can be provided to participants. This is valuable because the Cooperative Extension agent can obtain a copy of test results to see if test kits are being used then track the results.

A more extensive radon resource that can be used in a workshop is the radon lesson module from Healthy Indoor Air for America's Homes (www.healthyindoorair.org/radon.htm). As an overview, it includes the following:

- Radon is known to cause lung cancer in humans over a long period of exposure.
- Radon is present nearly everywhere in small concentrations and is the largest source of radiation exposure for the U.S. population.
- Radon cannot be detected without testing for it specifically because it is invisible, odorless, and chemically inert.
- Testing is simple, relatively inexpensive, and harmless to complete.
- Radon is a manageable risk, and help is available to assist the homeowner.

A PowerPoint presentation is included in the training kit for Healthy Indoor Air for America's Homes. (See www.healthyindoorair.org/ordering.htm for ordering information). The Web site

has an excellent series of myths and facts to prepare the workshop presenter for possible questions from participants.

The U.S. Environmental Protection Agency's Web site for radon (www.epa.gov/radon/index.html) is a useful site, although it sometimes requires extensive navigation to find specific information. It contains general radon information for consumers, health risks, an EPA map of radon zones, risk assessment, radon and real estate, and radon resistant new construction. A variety of publications may be downloaded or ordered for free. These include *A Citizen's Guide to Radon*, *Home Buyer's and Seller's Guide to Radon*, *Consumer's Guide to Radon Reduction*, *Building Radon Out*, *A Radon Guide for Tenants*, and *Buying a New Home: How to Protect Your Family from Radon*. For a complete listing, visit www.epa.gov/radon/pdfs/nram/radon_materials_order_form.pdf. Many of these publications are available in English and Spanish, and they may be selected for a workshop's intended audience (consumers, builders, or real estate professionals). *A Citizen's Guide to Radon* is the best publication to use in a workshop directed at consumers. For ideas on radon workshops and other educational activities, review the site for National Radon Action Month (January). There is an event planning kit that provides press releases, public service announcements, and communication tips (www.epa.gov/radon/nram/event_kit.html).

The Healthy Colorado Homes work team of Colorado State University's Extension Service adapted EPA materials to create two PowerPoint presentations. One is an hour-long program best used with consumers (*EPA Radon Overview – short version*). The second PowerPoint is designed for a two-hour workshop for builders or real estate professionals (*EPA Radon Overview – long version*). They can be downloaded at <http://healthycoloradohomes.colostate.edu/radon.shtml>. The presentations have excellent graphics and have proved to be successful in workshops.

Other resources for radon information are available. For example, the American Association of Radon Scientists and Technologists (www.aarst.org) offers more technical information, including research. The American Lung Association provides an overview of radon through a video titled *Radon: The Risk Indoors* (www.lungusa.org/site/apps/s/content.asp?c=dvLUK9O0E&b=34706&ct=67115). Other resources include the National Radon Safety Board, which includes a locator for a radon measurement or mitigation specialist in your area (www.nrsb.org/SpecialistLocator.htm), and the National Safety Council (www.nsc.org/ehc/radon.htm) with its Radon Hotline: 1-800-644-6999. Your state radon contact can also provide valuable information and potentially can assist in organizing a workshop. To determine your state contact, check with www.epa.gov/iaq/whereyoulive.html.

Given the dangers of radon in the home it is not surprising that a number of educational resources about radon exist. Workshops conducted by Cooperative Extension agents at Colorado

State University have been well-attended and highly evaluated. To start preparing your workshop, read your state or region fact sheet, spend some time on the EPA radon Web site, and review the short version of the *EPA Radon Overview* PowerPoint presentation.

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