7th Annual Mid-Atlantic Radon Stakeholder Meeting

Radon Health Effects and Communicating Radon Risk

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Objectives

At the conclusion of the talk, participants will be able to

❖ Describe the public health significance of Radon in Maryland
❖ Provide clients with information about State and Federal resources related to Radon
❖ Understand prevention and mitigation strategies and the importance of testing homes for Radon
Lung Cancer in Maryland

Lung and Bronchus Cancer
Incidence Rates* by State, 2014†

Range

- 25.6 to 52.8
- 53.0 to 59.2
- 60.1 to 67.3
- 68.6 to 91.4
Smoking Rates by State

Current Cigarette Use Among Adults (Behavior Risk Factor Surveillance System) 2016

About This Map
- 8.8% - <12.1%
- 12.1% - <15.3%
- 15.3% - <18.6%
- 18.6% - <21.8%
- 21.8% - 25.1%

States are color-coded based on their smoking rates.
Maryland: 2005-2016 Average Radon Measurements By ZIP Code

Map: Created by EPA Region III - Air Protection Division

Data provided by Air Chek, Inc., Alpha Energy Labs, Landauer Radon, RAData Inc., and Radon Testing Corp of America, Inc.

This map is for informational purposes only. EPA received this data from the referenced labs and cannot verify the accuracy or quality of the data. Labs collected data (January 2005 - April 2016) from testing kits that includes all testing performed, including pre and post mitigation, duplicate testing, different floors (basement, first floor, second floor, etc.), and different testing methods (charcoal canister, liquid scintillation, but not radon in water testing.)

References (from most recent Quality Assurance Plan for reference only, actual QAP used during data collection may be different.):
- Air Chek, Inc. "Laboratory Quality Manual." 06/17/2015
- RAdata Inc. "Quality Assurance Plan." - 01/20/2016

Date: 03/2016
Where Does Radon Come From?

- Natural decay product of Uranium $\rightarrow$ Thorium $\rightarrow$ Radium $\rightarrow$ Radon

- Alpha ($\alpha$) emitter with short half-life
Radon in Nature

➢ Most soils in the United States contain between 200 and 2,000 pCi of radon per liter of soil air (range 20 - >100,000 pCi/L)

➢ Outdoor air ranges from less than 0.1 pCi/L to about 30 pCi/L, but it probably averages about 0.2 pCi/L

➢ Radon in indoor air <1 pCi/l to about 3,000 pCi/L

➢ The amount of radon dissolved in ground water ranges from about 100 to nearly 3 million pCi/L
## Cancer Mortality 2018

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Estimated U.S. Deaths in 2018&lt;sup&gt;4,5&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lung and Bronchus</td>
<td>154,050</td>
</tr>
<tr>
<td>2. Colon and Rectum</td>
<td>50,630</td>
</tr>
<tr>
<td>3. Pancreas</td>
<td>44,330</td>
</tr>
<tr>
<td>4. Breast</td>
<td>41,400</td>
</tr>
<tr>
<td>5. Liver and Intrahepatic Bile Duct</td>
<td>30,200</td>
</tr>
<tr>
<td>6. Prostate</td>
<td>29,430</td>
</tr>
<tr>
<td>7. Leukemia</td>
<td>24,370</td>
</tr>
<tr>
<td><strong>Radon-Induced Lung Cancer</strong></td>
<td><strong>21,100</strong>&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>8. Non-Hodgkin Lymphoma</td>
<td>20,960</td>
</tr>
<tr>
<td>9. Urinary Bladder</td>
<td>17,240</td>
</tr>
<tr>
<td>10. Esophagus</td>
<td>15,650</td>
</tr>
<tr>
<td>11. Kidney and Renal Pelvis</td>
<td>14,970</td>
</tr>
<tr>
<td>12. Ovary</td>
<td>14,070</td>
</tr>
<tr>
<td>13. Myeloma</td>
<td>12,770</td>
</tr>
</tbody>
</table>

* The 21,100 radon-induced lung cancer deaths also are included in the estimate of lung and bronchus cancer deaths. The 21,100 estimate is based on risk estimates using U.S. demographic information from 1995.

### Source
Reducing the Risk from Radon: Information and Interventions

A Guide for Health Care Providers

RadonLeaders.org

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**Talking With Your Patients About Radon**
## Health Effects of Radon

### Smokers

<table>
<thead>
<tr>
<th>Radon Level</th>
<th>If 1,000 people who smoked were exposed to this level over a lifetime*...</th>
<th>The risk of cancer from radon exposure compares to**...</th>
<th>WHAT TO DO: Stop smoking and...</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 pCi/L</td>
<td>About 260 people could get lung cancer</td>
<td>250 times the risk of drowning</td>
<td>Fix your home</td>
</tr>
<tr>
<td>10 pCi/L</td>
<td>About 150 people could get lung cancer</td>
<td>200 times the risk of dying in a home fire</td>
<td>Fix your home</td>
</tr>
<tr>
<td>8 pCi/L</td>
<td>About 120 people could get lung cancer</td>
<td>30 times the risk of dying in a fall</td>
<td>Fix your home</td>
</tr>
<tr>
<td>4 pCi/L</td>
<td>About 62 people could get lung cancer</td>
<td>5 times the risk of dying in a car crash</td>
<td>Fix your home</td>
</tr>
<tr>
<td>2 pCi/L</td>
<td>About 32 people could get lung cancer</td>
<td>8 times the risk of dying from poison</td>
<td>Consider fixing between 2 and 4 pCi/L</td>
</tr>
<tr>
<td>1.3 pCi/L</td>
<td>About 20 people could get lung cancer</td>
<td>(Average indoor radon level)</td>
<td>(Reducing radon levels below 2 pCi/L is difficult.)</td>
</tr>
<tr>
<td>0.4 pCi/L</td>
<td>About 3 people could get lung cancer</td>
<td>(Average outdoor radon level)</td>
<td></td>
</tr>
</tbody>
</table>

Note: If you are a former smoker, your risk may be lower.

* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA-402-R-03-003).

** Comparison data calculated using the Centers for Disease Control and Prevention’s 1999-2001 National Center for Injury Prevention and Control Reports.

### Non-Smokers

<table>
<thead>
<tr>
<th>Radon Level</th>
<th>If 1,000 people who never smoked were exposed to this level over a lifetime*...</th>
<th>The risk of cancer from radon exposure compares to**...</th>
<th>WHAT TO DO:</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 pCi/L</td>
<td>About 36 people could get lung cancer</td>
<td>35 times the risk of drowning</td>
<td>Fix your home</td>
</tr>
<tr>
<td>10 pCi/L</td>
<td>About 18 people could get lung cancer</td>
<td>20 times the risk of dying in a home fire</td>
<td>Fix your home</td>
</tr>
<tr>
<td>8 pCi/L</td>
<td>About 15 people could get lung cancer</td>
<td>4 times the risk of dying in a fall</td>
<td>Fix your home</td>
</tr>
<tr>
<td>4 pCi/L</td>
<td>About 7 people could get lung cancer</td>
<td>The risk of dying in a car crash</td>
<td>Fix your home</td>
</tr>
<tr>
<td>2 pCi/L</td>
<td>About 4 person could get lung cancer</td>
<td>The risk of dying from poison</td>
<td>Consider fixing between 2 and 4 pCi/L</td>
</tr>
<tr>
<td>1.3 pCi/L</td>
<td>About 2 people could get lung cancer</td>
<td>(Average indoor radon level)</td>
<td>(Reducing radon levels below 2 pCi/L is difficult.)</td>
</tr>
<tr>
<td>0.4 pCi/L</td>
<td>About 0.4 people could get lung cancer</td>
<td>(Average outdoor radon level)</td>
<td></td>
</tr>
</tbody>
</table>

Note: If you are a former smoker, your risk may be higher.

* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA-402-R-03-003).

** Comparison data calculated using the Centers for Disease Control and Prevention’s 1999-2001 National Center for Injury Prevention and Control Reports.

(Source: https://www.epa.gov/radon/health-risk-radon)
Outreach Efforts

• Maryland Department of Health and Maryland Department of the Environment working together to increase awareness, testing
• Print Flyers
• Social Media
• Health Care Providers
MARYLAND RADON FACTS
How to Protect Yourself and Your Family from Radon

What is Radon? Why Is it Important?
Radon is an invisible radioactive gas in the earth that can get into your home. Breathing Radon can increase your risk of lung cancer. If you smoke, Radon increases your risk of lung cancer even more than if you don’t smoke.

The only way to know how much Radon is in your home is to do a Radon test. If your home has too much Radon, it is possible to remove the Radon and lower the risk of cancer for you and your family.

Where is Radon found in Maryland? (See Map)
Although Radon can be found anywhere, some parts of Maryland have soil that make Radon more likely. Basements and first floors typically have the highest Radon levels because of their closeness to the ground.

Why should I test my home for Radon?
Radon causes cancer. The longer you and your family are exposed to Radon, the greater the risk of lung cancer. The risk is especially high for people who also smoke.

How do I test my home?
Testing your home is easy. Look for test kits in most area hardware stores and home improvement stores. Look for test kits that are certified by NRPB or NRSL, and follow the directions on the package. Generally, you should:

- Place the test kit in the lowest level that people will occupy, and in the areas that are most heavily used (like bedrooms, playrooms)
- Place the kit in a dry area (not bathrooms or kitchens) where the kit will not be disturbed, and are not near moving air (windows, ventilation ducts)
- Leave the kit for somewhere between 2 and 90 days (the longer the test, the more accurate it is), send them up immediately and mail to the testing company.


Quick Facts:
- Testing your home for Radon is cheap and easy, and it’s the only way to know if your family is at risk.
- It’s easy to fix Radon problems in homes and schools.
- There are ways to make new homes Radon-resistant.

What Does My Test Mean?
Your Radon test result is used to decide whether additional testing or some mitigation (removal of Radon) is necessary. If your test is:

<table>
<thead>
<tr>
<th>Level of Radon</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 pCi/L</td>
<td>No further action needed</td>
</tr>
<tr>
<td>2 pCi/L or more</td>
<td>Consider another test in the future if the condition of the home changes (adds &amp; changes to basement, etc.)</td>
</tr>
</tbody>
</table>

You should do another test (within three months to one year) to confirm the results if you plan to take action. Contact certified Radon Mitigation Contractors.

While Radon does increase the risk of cancer, the good thing is that you can eliminate the risk by getting rid of the Radon. If your home has Radon and you or someone in your family smokes, the risk of cancer is higher. Call the Maryland Tobacco Hotline at 1-800-QUIT NOW (1-800-784-8659).

Can I fix my home if it has Radon?
Yes. Fixing your home is usually easy and not very expensive. You can find a list of Radon contractors at the EPA’s website and look for Radon detectors online.

For More Information:
www.maryland.gov/environmental/health/health_topics/air_radon.html
1-866-703-3266
## What Should You Tell Your Patients?

### What Does My Test Mean?

Your Radon test result is used to decide whether additional testing or some mitigation (removal of Radon) is necessary. If your test is:

<table>
<thead>
<tr>
<th>Radon Level</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 pCi/L</td>
<td>No further action is needed at this time; consider another test in the future if the condition of the home changes (cracks in basement, etc.)</td>
</tr>
<tr>
<td>2-Less than 4 pCi/L</td>
<td>No action is needed, but you should re-test at least every 5 years or if home conditions change (construction, new basement, etc.)</td>
</tr>
<tr>
<td>4 pCi/L or more</td>
<td>You should do another test (either short- or long-term) to confirm the results; if confirmed, consult a certified Radon Mitigation Contractor</td>
</tr>
</tbody>
</table>

While Radon does increase the risk of cancer, the good thing is that you can eliminate the risk increase by getting rid of the Radon. If your home has Radon and you or someone in your family smokes, the risk of cancer is higher. Call the Maryland Tobacco Quitline at: 1-800-QUIT NOW (1-800-784-8669)
Radon-Resistant New Construction

(Source: https://www.epa.gov/radon/radon-resistant-construction-basics-and-techniques)