What IS Radon (Rn) and Why Should We Care?

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What Is Radon?

- Radon is an odorless, colorless, toxic gas that is derived from the decay of uranium in the soil.
- Form of radiation that attacks lung tissue.
- Radon is the #1 cause of lung cancer among non-smokers.
- Smoking *increases* your risk 4 times!
- Estimated 21,000 deaths a year and rising.
- Elevated indoor levels found in every state.
Where Does Radon Come From?

- Radon is caused by a breakdown of Uranium in the earth’s crust. It is present in almost all rock, soil, and water.

- The amount of radon in the soil depends on soil chemistry, which varies greatly from one house to the next.

- Radon moves up through the ground into the atmosphere where it can potentially enter your home through cracks/holes in your home’s foundation.
Could My Home Have Radon?

1 in 15 homes in US are above 4 πCi/L. ALL HOMES SHOULD BE TESTED FOR RADON! Regardless of location, zone, home design or if your neighbor tested.

Are YOU at risk for lung cancer due to high radon levels? TEST YOUR HOME!
Houses Suck...
Potential Radon Entry Points
Examples of Entry Points

- Cracks in concrete slabs.
- Spaces behind brick veneer walls that rest on uncapped hollow block foundations.
- Pores and cracks in concrete blocks.
- Floor-wall joints (cold joints).
- Exposed soil, as in a sump or crawl space.
- Weeping (drain) tile, if drained to an open sump.
- Mortar joints.
- Loose fitting pipe penetrations.
- Open tops of block walls.
- Building materials, such as brick, concrete, rock.
- Well water.
Radon decays into radioactive alpha particles.

These particles are inhaled and deposited in the lungs.

Causes physical damage to DNA, increasing the potential for cancer.
Radon Decay Products

Po-218 and Po-214 deliver the majority of radiation dose to the lung.
What Level of Rn is Considered Safe?

- There is no known safe level of radon.
- 9 to 12% of lung cancers are radon induced.
- EPA recommends homes with radon levels over 4 pCi/L be mitigated.
  - Not a health based standard.
  - Based on mitigation technology.
- WHO health based action level 2.7 pCi/L.
Health Effects Of Radon

- 2nd leading cause of lung cancer in the United States
  - Estimated to cause 21,000 deaths annually*
  - Second only to smoking
- Leading cause of lung cancer for non-smokers
  - 2,900 deaths annually

* EPA Assessment of Risks from Radon in Homes (June 2003, EPA -402-R-03 -0003)
Radiation is a carcinogen (cancer causing agent).

Most of these cancers do not appear until many years after the radiation dose (~10-40 years).

- Radiation may also cause other health effects:
  - links to leukemia, stomach and liver cancer
  - exposure during pregnancy potential links
    - genetic defects in children
    - mental retardation
Most radon-induced lung cancer occurs below EPA’s action level (4piC/L mitigation level based).

Radon exposure increases the risk of all types of lung cancer.

Prevention/mitigation methods reduce the risk.
Chances Of Developing Cancer Due To Radon Depend On:

- The levels of radon in the home - Dose
- Amount of time spent in the home - Duration
- Pre-Disposition
  - Smoker
  - Non-smoker
  - Previous Smoker
- Genetics
Comparing Radon Related Cancer to Other Cancer Types

“Stigma” of lung cancer

Source: Bill Field, 2005, UI
<table>
<thead>
<tr>
<th>Radon Level</th>
<th>Non Smoker</th>
<th>What to Do:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>20 pCi/L</strong></td>
<td>About 36 people could get lung cancer</td>
<td>35 times the risk of drowning</td>
</tr>
<tr>
<td><strong>10 pCi/L</strong></td>
<td>About 18 people could get lung cancer</td>
<td>20 times the risk of dying in a home fire</td>
</tr>
<tr>
<td><strong>8 pCi/L</strong></td>
<td>About 15 people could get lung cancer</td>
<td>4 times the risk of dying in a fall</td>
</tr>
<tr>
<td><strong>4 pCi/L</strong></td>
<td>About 7 people could get lung cancer</td>
<td>The risk of dying in a car crash</td>
</tr>
<tr>
<td><strong>2 pCi/L</strong></td>
<td>About 4 people could get lung cancer</td>
<td>The risk of dying from poison</td>
</tr>
<tr>
<td><strong>1.3 pCi/L</strong></td>
<td>About 2 people could get lung cancer</td>
<td>(Average indoor radon level)</td>
</tr>
<tr>
<td><strong>0.4 pCi/L</strong></td>
<td>About 1 person could get lung cancer</td>
<td>(Average outdoor radon level)</td>
</tr>
</tbody>
</table>

*If 1,000 people who never smoked were exposed to this level over a lifetime.*

**The risk of cancer from radon exposure compares to...**
<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:</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 52 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>5 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></td>
<td>(Average outdoor radon level)</td>
<td></td>
</tr>
</tbody>
</table>
TEST, FIX, SAVE A LIFE.

*Every* home should be tested

- Testing is easy
  - No special skills required
  - Only takes a couple of minutes to set

- It’s inexpensive!!!
  - Especially when compared to medical treatment
Adverse health effects of radon will increase as more people are:

- Exposed in homes and work,
- Our population ages, and
- Increased medical-related radiation exposure
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