Lung Cancer Prevention Through Radon Risk Communication[1]

Text: Radon conversation in the physician's office

Anyone can get lung cancer; in fact, about 1 in 7 individuals who do develop lung cancer have never smoked. The top two causes of lung cancer are smoking (no. 1) and radon exposure (no. 2). We cannot undo risks associated with past smoking and radon exposure, but there are some steps we can take to reduce risk going forward. To maximize risk reductions remediate your home for radon AND stop smoking if you smoke; doing these together is more beneficial than one or the other alone.

Anyone can get cancer and some individuals are more at risk of lung cancer due to their genetic make-up. The sooner you reduce radon exposure, the greater the risk reduction. Compared with treatment for lung cancer, the cost of radon remediation is low (for example, similar to the cost of a minor home repair) and provides the benefits of reduced radon exposure for everyone living in the house.

Text: Radon risk reduction

A person's lung cancer risk increases above their base risk in proportion to their radon exposure. The base risk depends on age, sex and smoking status. Current smokers and recent ex-smokers are at a higher risk than long-time non-smokers and never smokers. The EPA estimated that, in 1995, 21,000 lung cancer deaths in the US resulted from residential radon exposure (5), which makes radon the second leading cause of lung cancer after cigarette smoking.

An individual who is a current smoker, but is not exposed to radon, has an estimated risk of 10% (4) of dying from lung cancer. Living in a home with 4 pCi/L adds roughly 6% to their risk, resulting in a total risk of 16% for death from lung cancer (6). In nearly all homes, high radon levels can be dramatically reduced at a reasonable cost which would lower the radon-related lung cancer risk for all the occupants. Significant risk reduction is possible for a 50-year-old smoker who quits and reduces their home's radon level with a mitigation system (9). For such an individual living in a Midwest home whose radon level is 4 pCi/L, a radon mitigation system could eliminate more than half of their lifetime radon-related risk, reducing it from 6% to 3% (9, 10, 15).

The costs of lung cancer prevention through radon mitigation are relatively low compared to those associated with diagnosing and treating a lung cancer (16). A typical mitigation system has a lower installation cost than a glass patio door replacement and the daily operating cost of roughly $1/day is less than most cable TV services (17). Finally the benefits of avoiding the pain, suffering and low survival rate of a radon-related lung cancer are substantial, but harder to quantify.

Text: Radon exposure and risk

National and international health organizations such as the US Environmental Protection Agency, US Public Health Service, International Agency for Research on Cancer and World Health Organization have identified radon exposure as a significant cause of lung cancer (1-3, 14). The scientific evidence for radon-induced lung cancer was generated by studies of the effects of radon on cells, animals, and humans (5-9). The most direct evidence for radon's risk to the general public comes from case-control epidemiological studies performed worldwide that show a higher risk of lung cancer in people exposed in their homes to higher levels of radon than similar people exposed to lower levels of radon.

One example of a residential radon exposure study is the Iowa Radon Lung Cancer Study, which was a detailed investigation of the radon-related lung cancers in women who had lived in their homes for 20 or more years (10). Those women who lived in homes with an average radon concentration showed a 50 to 80% increase in lung cancers compared to those women who lived in the lowest radon homes. Similar effects were found in studies across the world. The combined results of seven (7) residential studies done in North America, 13 in Europe, and two in China have established that there is a significant lung cancer risk even below the US EPA's action level of 4 pCi/L (11, 12, 13).

[1] This text is designed for Midwest medical professionals working with smoking cessation therapy patients. It is not all inclusive or highly technical. References and resources are included for those interested in more detailed information.
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References and resources

Summary documents from public health organizations

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WHO handbook on indoor radon: A public health perspective. Geneva:; 2009.
http://www.who.int/ionizing_radiation/env/radon/en/index1.html
WHO (IARC) http://www.inchem.org/documents/iarc/vol43/43-02.html

3 Health Physics Society UPDATE ON PERSPECTIVES AND RECOMMENDATIONS ON INDOOR RADON
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https://hps.org/documents/radon_position_statement_background_document.pdf

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Radon Risk assessments based on miner exposures

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Comparative risk assessments based on various residential and miner exposure models

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14 US Department of Health and Human Services Public Health Service Agency for Toxic Substances and Disease Registry 2012Toxicological Profile for Radon (http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=407&tid=71)

Radon mitigation effectiveness

15 Steck DJ. Radon-related lung cancer and mitigation cost-effectiveness in a radon prone region. Twentieth International Radon Symposium Columbus, OH October 2010. Available at
http://aarst.org/proceedings/2010/08_RADON_RELATED_LUNG_CANCER_DEATHS_AND_MITIGATION_COST_EFFECTIVENESS_IN_A_RADON-PRONE_REGION.pdf

16 Steck DJ. The effectiveness of mitigation for reducing radon risk in single-family Minnesota homes. Health Phys, 2012 103(3):241-248.2012

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https://www.aarst.org/proceedings/2010/08_RADON_RELATED_LUNG_CANCER_DEATHS_AND_MITIGATION_COST_EFFECTIVENESS_IN_A_RADON-PRONE_REGION.pdf