

**ENGAGING ONCOLOGY NURSES IN A PRIMARY PREVENTION  
PROJECT RELATED TO RADON EXPOSURE: OUTCOME ANALYSIS  
AND IMPLICATIONS FOR PRACTICE**

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**Abstract**

The position statement of the Oncology Nursing Society supports the role of oncology nursing to educate and facilitate integration of cancer prevention in clinical practice (ONS, 2007). The Radon Education Project (REP) had two aims. First, to increase oncology nurses knowledge of the association between radon exposure and lung cancer through an educational program as evaluated by an online survey. Second, to identify how primary prevention strategies related to radon exposure can be incorporated into clinical practice as recommended by participants in follow up focus groups. The final output was the development of a white paper as a guide for oncology nurses in clinical practice. This is the first documented initiative where oncology nurses have partnered with a state department of health in a formalized, programmatic approach to radon education. Oncology nurses were able to identify programmatic and prescriptive strategies for incorporating primary prevention education on radon into clinical practice.

**Project Partnerships**

**Oncology Nurses**

Although oncology nurses typically work in a variety of roles in tertiary care, most are aware of risk factors that lead to the development of cancer and the importance of early detection to improve outcomes. For instance, knowing the association between smoking and the development of lung cancer, oncology nurse often assess patients for a smoking history during clinic visits and can advocate for patients and family members to participate in smoking cessation programs. This general understanding of the principles of risk reduction through primary and secondary prevention for cancer could guide behaviors; like radon testing and mitigation, applicable to themselves and to patients and their families.

The Oncology Nursing Society (ONS) is a national organization of oncology nurses whose mission is dedicated to promoting excellence in oncology nursing and quality cancer care (ONS, 2011). The national organization was founded in 1975 and has grown to over 35,000 members, 231 chapters and 27 special interest groups (ONS, 2011). It has four local chapters in

Minnesota. The largest chapter, Metro MN ONS, draws its membership from the Minneapolis/St. Paul area.

In addition, ONS supports oncology nurses work in the area of primary prevention. In their organizational position statement it acknowledges that oncology nurses can develop, implement and evaluate measures to ensure that individuals and families have access to education about cancer prevention and appropriate cancer screening (ONS, 2007). The position statement supports primary prevention strategies in general, but is not specific in the area of radon and does not provide specific education or support to prepare practitioners to educate patients and their families on radon and lung cancer.

### **Minnesota Department of Health and Minnesota Cancer Alliance**

Organizations that focus on radon in Minnesota collaborated with Metro MN ONS in implementing the REP. The MDH received the State Indoor Radon Grant from the federal government for the purpose of protecting the health of the public from the risks of radon related lung cancer (MDH, 2010). The Minnesota Cancer Alliance (MCA) is a broad coalition of organizations and leaders from diverse backgrounds and disciplines dedicated to reducing the burden of cancer across the continuum from prevention to end-of-life care (MCA, 2013). In response to this charge, they developed a five year plan. Cancer Plan Minnesota 2011-2016 is a framework for action created by the partners of the MCA (2011) to address the burden of cancer in Minnesota. One area for intervention identified in the framework is to educate stakeholders about radon safety. The medical community has been one partner targeted for education on the health risks of radon and how to effectively communicate these facts to patients (MDH, 2010).

### **Radon Education Project Overview**

The purpose of the Radon Education Project (REP) was to evaluate knowledge and perception of the relationship between lung cancer and radon exposure among the nurses who belonged to the Metro MN Chapter of ONS and to identify how oncology nurses might incorporate radon safety education into clinical practice. If successful, this project could serve as a model for organizing other alliances in these efforts locally and nationally. The focus group recommendations for integrating primary prevention into practice have the potential to advance the role of the oncology nurse in the area of radon exposure and risk reduction.

The purpose of the REP was to educate and develop recommendations for a primary prevention strategies related to radon for oncology nurses in the Metro MN Chapter of ONS. This was accomplished through an educational program for oncology nurses focused on increasing knowledge of the association of radon and lung cancer. This program was evaluated by an online survey. Several months after attending the educational program, participants were invited to follow up focus groups to identify how primary prevention strategies related to radon exposure might be incorporated into oncology clinical practice.

The scientific evidence to support the causal relationship between radon and lung cancer has been well described. Therefore, the REP was not designed to add to the scientific knowledge, but sought to explore perceptions and knowledge related to radon and lung cancer.

### **Literature Review**

Given the overwhelming scientific evidence of the association of radon to lung cancer, the literature surprisingly lacks research focused on knowledge and perception related to radon exposure risk. Despite this limitation, the literature review did yield some important findings that focus on education, radon risk perception and correlates that may guide nursing radon education. Radon perception and sociodemographic correlates demonstrate that a knowledge deficit exists related to radon health risk and that there is a common perception that personal risk associated with radon is low. Knowledge about radon is often superficial and can lead to misconceptions and incorrect conclusions about risk. Demographic data analysis also yielded interesting but inconsistent findings. Although education and household income may lead to greater testing, there is no data to suggest that there is an association with mitigation in homes with high levels of radon. There was no specific published data on knowledge and perception of radon risk by oncology nurses or other health care professionals. Since health care providers are the primary source of health information, education is clearly needed to help achieve a greater understanding of radon health risks by health care professionals and the general public.

### **Project Design and Methodology**

The REP was a mixed methods design to explore knowledge and perceptions of oncology nurses about radon exposure and lung cancer. The ultimate goal was to identify and recommend strategies for incorporating primary prevention education into clinical practice. The study participants were recruited from members of the Metro MN Chapter of the ONS who attended an in-service at a monthly meeting. The project had three phases. In Phase I, an educational program was developed and presented that met the standards for certified CE programming from the ONS national organization. All attendees were offered free radon test kits. Some of the attendees at the educational program signed a consent form indicating interest in participating in the next phase of the REP. These individuals completed a post in-service online survey. In Phase II, focus groups were designed and offered to individuals who attended the Phase I educational program. Phase III included the development of a white paper (Appendix A) on radon and lung cancer which was based on the recommendations gleaned from the focus groups. This paper was presented to the Metro MN ONS Board for adoption and posting on the website.

To safe guard informed consent in this study, an application was submitted for review to the Institutional Review Board (IRB) at St. Catherine University prior to the implementation of both Phase I(education phase) and Phase II (focus groups) for this study.

## **Phase I: Educational Program**

In March 2012, a continuing nursing education activity on radon and lung cancer was approved by ONS, which is an accredited approver through the American Nurses Credentialing Center. The educational activity was presented on April 10, 2012 during the monthly meeting of the Metro MN Chapter of the ONS with a total of 66 members and affiliates in attendance. Of these attendees, 41 Metro MN ONS members signed consent forms for participation in the REP. Of the 41 who signed consent forms, a total of 33 completed the online survey with the questions found in Table 1.

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1. What is your practice setting?
  2. What is your highest degree you have received in nursing?
  3. Number of years you have worked in oncology nursing?
  4. Prior to this educational program, have you tested your home for radon?
  5. Prior to this educational program, was your home mitigated for radon?
  6. Did you test your home with the radon test kit provided at the radon educational program at Metro MN ONS?
  7. Did you or are you planning to mitigate your home due to test results?
  8. Did you share information about this program on radon and lung cancer with family and friends?
  9. Was the educational program relevant to you personally?
  10. In what ways do you think you may use the information you learned in the program in your practice?
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Table 1: Post radon education electronic survey questions

## **Phase II: Focus Groups**

In the fall of 2012 members of the Metro MN Chapter of ONS who attended the educational program on radon exposure and lung cancer and signed consent forms for participation were invited to attend one of three follow up focus groups. Focus groups were conducted between five to seven months after attending the educational program. Participants included oncology nurses holding various positions (research, management and clinical practice) from five health care institutions within a large metropolitan area.

Each focus group began with a review of relevant information on radon and lung cancer covered in the educational inservice in April as well as a short discussion on the key findings from the online survey. Participants were provided with the ONS definition for primary prevention: Primary cancer prevention refers to the prevention of cancer through health

promotion and risk reduction (ONS, 2013). Open ended questions were utilized to elicit possible ways that radon education might be incorporated into clinical practice (Table 2).

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1. Now that we just recapped information on radon and lung cancer, tell us why you attended the program?
  2. Tell me how primary cancer prevention compares to your current role in oncology clinical practice? (To clarify also do you utilize health promotion or risk reduction activities currently in your work?)
  3. Talk about specific ways that radon and lung cancer education testing and mitigation can be done in clinical practice? (To clarify, how can it be accomplished? Any specific time point in the trajectory of the disease that you feel will be more relevant for primary cancer prevention?)
  4. Tell me a little about what may be potential challenges to bringing forth this information to oncology patients and educating cancer patients and their families?
  5. What do you feel are the necessary components in developing a position paper or white paper for Metro MN on radon and lung cancer education?
    - a. Consider the role of the oncology nurse?
    - b. General or specific components?
    - c. What should be included?
    - d. What steps are required?
    - e. The position of the Metro MN ONS on radon and lung cancer education in oncology clinical practice is.....?

Table 2: Focus group questions

### **Phase III: White Paper**

The oncology nurses who participated in the focus groups were informed that their input would be used in the development of a radon education document for clinical practice. This document was envisioned to be either a position paper or white paper. Definitions were provided for both types of documents during the focus group.

### **Data Analysis**

#### **Phase I**

Data collection of the Phase I educational program was done via an electronic survey. Survey questions were constructed to assess learning, motivation to complete radon testing and mitigation if indicated, and to assess study participants interest in sharing radon safety information with family, friends or patients.

Summary of the survey revealed that study participants worked primarily in the outpatient setting and represent oncology nurses from five health care institutions within a large metropolitan area. Participants worked in a variety of oncology roles including research, clinical practice, nurse practitioner, clinical nurse specialist, clinical coordinator and hospice nurse (Figure 1). Other demographic data were also collected. The majority of nurses had a Bachelor of Science in Nursing (BSN) degree and worked for more than 20 years in oncology nursing.

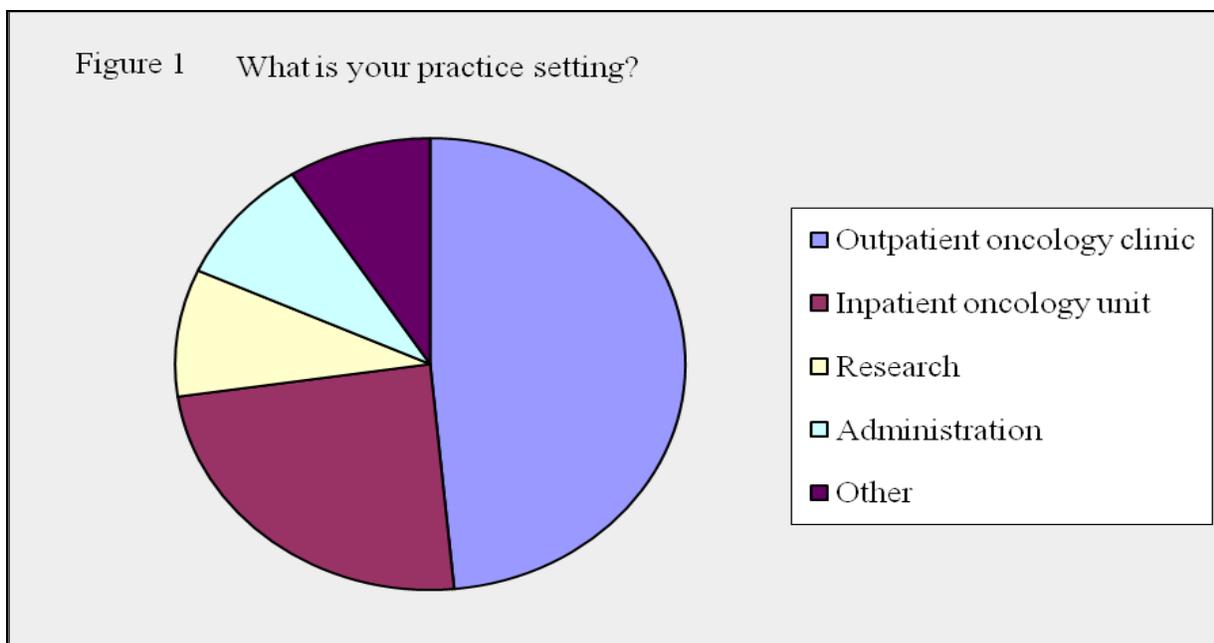


Figure 1: Responses to practice setting question.

Responses to content items indicated that 46% tested their home for radon prior to the educational program and that 46% also tested with the radon test kit provided at the Metro MN ONS meeting. In addition, 94% shared the information on radon and lung cancer with family or friends and 100% stated that the information was relevant to them personally and the majority identified applicability to clinical practice. Survey comments were generally positive and demonstrated interest and the importance of radon testing and mitigation.

In addition, a quantitative assessment was completed on actual radon testing done by participants. A number was assigned to the test kit and the laboratory sent the radon test result using the number and not the participant name. Utilization of the radon kits and responses to the survey were summarized (Table 5). Radon test kits offered at the conclusion of the program and laboratory results were tabulated. A total of 49 participants used the radon test kit provided at the program. Six test kits were inevaluable. Radon test levels ranged from 0.7 -18.3. A total of 12 tests out of 43 evaluable results (28%) exceed the EPA action level of 4Pci/L. These results were better compared to the Minnesota Department of Health data that states that two in five

homes (40%) have radon levels that are rated high radon zones (MDH, 2013). This may be related to the high testing already done by participants prior to the in-service. Survey results showed that 46% of the project participants had tested their homes for radon prior to the program.

Test Kits Used	Prior Testing	Inevaluable Tests	Test Level Range	% Above EPA Action Level	% MN Homes Above EPA Action Level
49 (74%)	46%	6 (12%)	0.7 – 18.3	28%	40%

Table 5: Radon test kit results

In a cross sectional study, Larsson, Hill, Odom-Maryon and Yu (2009), reported the results of radon testing in 1994 and 1998 in National Health Interview Surveys. Of the individuals who had heard of radon, a follow up question was given on whether their household air has been tested for radon. A total of 9.7% and 15.5% answered affirmatively (Larsson et al., 2009). In another study Nissen, Leach, Nessen, Swenson, and Kehn (2006), investigated the testing rate by patients instructed on radon in a primary care practice where patients had a radon testing rate at baseline of 24.7%. The high level of testing by the oncology nurses, prior to the REP, may demonstrate their interest in adopting protective behaviors around radon consistent with primary prevention. This result also aligns well with the hypothesis that oncology nurses will engage in behaviors from which they anticipate deriving personally valued benefits. This appears evident from the high testing rate at baseline and suggests this is a motivated group.

## Phase II: Focus Groups

In Phase II, three focus groups were conducted and audio taped. Data were captured using a transcript-based analysis. In alignment with an analysis methodology described by Krueger and Casey (2009), a classic analysis strategy guided identification of themes and categorized results. The analytical framework used key concepts. This framework was useful to understand how participants view a topic and identify important ideas, experiences, and preferences that illuminate the results.

The oncology nurses, within the Metro MN chapter of ONS, are a homogeneous population as compared to nurses that may choose to work in a primary care. Oncology nurses within ONS are voluntary members of this organization. Nurses who join ONS tend to be committed to oncology practice and to this specialized work. In addition, ONS has standards for patient care related to chemotherapy administration and side effect management. Therefore, this commitment to a specialized practice that has national standards of care may create a group of

nurses with similar thoughts about practice related questions. These factors may have resulted in an easier path for focus group content analysis as similar ideas emerged within each focus group.

Evaluation of Phase II involved data analysis of the tapes transcribed from the focus groups. Content was analyzed for emerging themes related to participant recommendations for incorporating radon safety education into clinical practice. These recommendations for practice are important to advance the field in the area of primary prevention and the role of the oncology nurse. Five themes were identified.

**Theme one: Education.** The first theme related to education. Several focus group participants stated that they did not know much about radon prior to the educational in-service. They identified education of oncology nurses and physicians as important so health care professionals could be knowledgeable on the topic of radon and lung cancer when speaking with patients. This was identified as a challenge and described in this way: “Feeling that you can’t give a proper answer. Who wants to give an answer if they don’t know about it?” Another nurse engaged her colleagues on the topic of radon and, based on their responses, expressed concern about their knowledge level stating the first priority should address the “need to educate nurses and doctors first.” Another nurse stated that the data are “what impresses people.” There was interest in understanding the data. One nurse describe it this way: “The recommended level [is] less than 4. Well what does it mean if it is 5? What does it mean if it is 7? What does it mean if it is 10? You might say well recommend level is 4, but mine is 5.4? Well that isn’t much higher than 4 so I don’t need to do anything about that. Is it logarithmic? Is 5.4 really extreme? Is 50 really extreme? People won’t be able to really know.”

**Theme two: Access.** The second theme identified was access to data and readily available information in the clinical setting. Data on radon and lung cancer should be easily accessible to oncology nurses and have contact information/websites and brochures available to educate patients and families. Nurses expressed that they have access to a library, but what they need are educational material such as brochures and teaching sheets. Other nurses shared that “getting this information out for oncology nurses is great.” and “if you have the brochures in the clinic then you can answer their questions.” The nurses also expressed that they should also have access to easily available information on how to test and mitigate your home. The nurses shared that this information was new to them and that it was important for all nurses to have readily accessible information.

**Theme three: Timing.** Another important theme related to the timing of patient education. Although the importance of educating patients was recognized, it was suggested that the timing of this education should be individualized to the patient. Some patients are open to receiving the information on radon after diagnosis or early on in treatment while others are overwhelmed with the new information. For some patients, education on radon may be best done later in the

trajectory of the disease possibly in a survivorship clinic. One nurse described her patients initially feeling overwhelmed by the teaching on disease and treatment in this way:

“There is usually a lot of information overload at first. But later down the line if someone is there for a week or two, which is often the case for some of these intensive treatments, it is a better time to talk to them.”

**Theme four: The role of ONS.** The role of ONS in primary prevention was also clearly stated as another theme. Oncology Nursing Society involvement was recognized as important endorsement for this work. The society is well established with a large national membership. Several nurses agreed with the statement of one participant that “if you have the ONS backing this position then it gives it a little more credibility.” The nurses referred to ONS involvement, or at least endorsement, of educating patients on radon in clinical practice as important. Focus group members stated that ONS approval or involvement in this work was positive, but could also be strengthened by forming partnerships with community, primary care and other organizations. It was described in this way: “maybe partnering with the American Lung Association or the Breathe of Hope Lung Foundation. Those are other key organizations, also, I am sure, would have a similar endorsement of this.”

**Theme five: Barriers.** There were barriers identified to radon education in the clinical setting. The cost of mitigation for homes above the EPA action threshold was a concern. If a patient is unable afford to mitigate their home, it was viewed as a barrier to patients being interested in learning about radon testing and mitigation. One nurse stated that the patient may not want the information as they may be concerned that they have to move and that no one would buy the house. Other barriers to educating in the clinical setting included limited time and lack of knowledge on the topic as well as physician/clinic support.

### **Phase III: White Paper**

The oncology nurses who participated in the focus groups were informed that their input would be used in the development of a radon education document for clinical practice. From the comments of the focus group participants, a prescriptive outline of data, information and references was developed. The white paper was adopted, without changes to format or content, by a unanimous vote by the Metro MN ONS board on September 10, 2013 and posted to the website. The membership was updated on the white paper on November 12, 2013 at their regular monthly meeting. Minnesota Department of Health supports radon educational outreach and reviewed the draft white paper with a few recommendations and no changes to the format.

## **Conclusion**

The REP was the first documented collaboration of oncology nurses and the MDH in educating oncology nurses on radon and lung cancer and identifying potential ways to educate patients in clinical practice. The Metro MN oncology nurses embraced the education and found the information to be highly relevant to them personally and professionally. Compared to the literature, the nurses that participated in the educational in-service had a higher percentage of testing their homes at baseline than seen in the general public. This higher than expected level of testing prior to the education program, possibly relates to their understanding of the health hazard related to radon. However, in follow up focus groups, nurses identified a knowledge deficit related to radon in themselves, their colleagues and physicians. So despite their recognition of the hazards of radon, their overall knowledge of radon risk to develop lung cancer is limited and mirrors the general population.

In the era of health care reform, the need to focus on cost of care and prevention of disease is desperately needed. Oncology nurses have a unique perspective on cancer and could be one entry point for a systematic and organized educational process on radon education in clinical practice. The departments of health and clinical practice settings have functioned independently when they clearly have an interdependent function in fostering the health of our nation. The Institute of Medicine clearly defines the initiative to collaborate (IOM, 2012). This greater utilization of combined resources may be what is needed in radon education in the future.

## References

- Copes, R. & Scott, J. (2007) Radon exposure: Can we make a difference? *Canadian Medical Association Journal*, 177(10), 1229-1231. Retrieved from <http://www.ncbi.nlm.nih.gov.pearl.stkate.edu/pmc/articles/PMC2043084/pdf/20071106s00021p1229.pdf>
- Denman, A.R., Timson, K., Shields, G., Groves-Kirkby, C.J., Rogers, S., Campbell, J.A., Phillips, P.J. (2009). Local health campaigns to reduce lung cancers induced by radon and smoking – Who responds? *Health Policy*, 93 (2-3), 201-206. doi: 10.1016/j.healthpol.2009.07.011
- Duckworth, L.T., Frank-Stromborg, M., Oleckno, W. A., Duffy, P., Burns, K. (2002). Relationship of perception of radon as a health risk and willingness to engage in radon testing and mitigation. *Oncology Nursing Forum*, 29(7), 1099-1107.
- Halpern, M.T. & Warner K.E., (1994). Radon risk perception and testing: Sociodemographic correlates. *Journal of Environmental Health*, 56(7), 31-35.
- Hill, W.G., Butterfield, P., Larsson, L.S., (2006). Rural parents' perception of risks associated with their children's exposure to radon. *Public Health Nursing*, 23(5), 392-399.
- Institute of Medicine of the National Academies. (2012). *Best care at a lower cost: The path to continuously learning health care in America*. Retrieved from [http://www.iom.edu/~media/Files/Report%20Files/2012/Best-Care/Best%20Care%20at%20Lower%20Cost\\_Recs.pdf](http://www.iom.edu/~media/Files/Report%20Files/2012/Best-Care/Best%20Care%20at%20Lower%20Cost_Recs.pdf)
- Lichtenstein, E., Boles, S.M., Lee, M.E., Hampson, S.E., Glasgow, R.E., Fellows, J. (2008)

Using radon risk to motivate smoking reduction II: Randomized evaluation of brief telephone counseling and a targeted video. *Health Education Research*, 23(2), 191-201.

Minnesota Cancer Alliance: (2011). *Cancer plan Minnesota: A framework for action*.

Retrieved from <http://mncanceralliance.org/wp-content/uploads/2013/09/CancerPlan-FINAL.pdf>

Minnesota Cancer Alliance. (2013). Reducing the burden of cancer.

Retrieved from <http://mncanceralliance.org/about>

Minnesota Department of Health. (2001). Public health interventions applications for public health nursing practice. Retrieved from

[http://www.health.state.mn.us/divs/opi/cd/phn/docs/0301wheel\\_manual.pdf](http://www.health.state.mn.us/divs/opi/cd/phn/docs/0301wheel_manual.pdf)

Minnesota Department of Health. (2013). Radon in Minnesota homes. Retrieved from

[http://www.health.state.mn.us/divs/eh/indoorair/radon/index.html?utm\\_source=print&utm\\_medium=brochure&utm\\_campaign=general](http://www.health.state.mn.us/divs/eh/indoorair/radon/index.html?utm_source=print&utm_medium=brochure&utm_campaign=general)

Minnesota Department of Health. (2010). *State indoor radon grant report*.

Retrieved from

<http://www.health.state.mn.us/divs/eh/indoorair/radon/sirgreport2010.pdf>

National Research Council. Committee on the Biological Effects of Ionizing Radiation

(BIER VI). *Health effects of exposure to radon*. Washington, DC: National Academy Press; 1999.

Nissen, M. J., Leach, J. W., Nissen, J. A., Swenson, K. K., Kehn, H. (2012). Radon testing and mitigation: An intervention in a primary care setting. *Journal of Cancer Education*, 27(3), 566-572. doi: 10.1007/s13187-012-0346-z

Oncology Nursing Society. (2007). Oncology Nursing Society Position: Prevention and early

- detection of cancer in the United States, *Oncology Nursing Forum*, 34(4), 759-760.
- Oncology Nursing Society. (2011). *About ONS*. Retrieved from <http://www.ons.org/about>
- Riesefeld, E.P., Marcy, T.W., Reinier, K., Mongeon, J.A., Trumbo, C.W., Wemple, B.E., Kaminshky, D.A. (2007). Radon awareness and mitigation in Vermont: A public health survey. *Health Physics*, 92(5), 425-431.
- Sethi, T. K., El-Ghamry, M. N., Kloecker, G. H. (2012). Radon and lung cancer. *Clinical Advances in Hematology & Oncology*, 10(3), 157-164.
- Steck, D. J. (2010). Radon-related lung cancer deaths and mitigation cost effectiveness in a radon-prone region. *The American Association of Radon Scientists and Technologists*. Abstract retrieved from [http://www.aarst.org/proceedings/2010/08\\_RADON\\_RELATED\\_LUNG\\_CANCER\\_DEATHS\\_AND\\_MITIGATION\\_COST\\_EFFECTIVENESS\\_IN\\_A\\_RADON-PRONE\\_REGION.pdf](http://www.aarst.org/proceedings/2010/08_RADON_RELATED_LUNG_CANCER_DEATHS_AND_MITIGATION_COST_EFFECTIVENESS_IN_A_RADON-PRONE_REGION.pdf)
- United States Environment Protection Agency. (2013). Reduce lung cancer risk in 2013 by testing your home for radon gas / elevated radon levels found in roughly 1 in 15 homes nationwide. Retrieved from <http://yosemite.epa.gov/opa/admpress.nsf/0/e0101775de4c6bf585257af3005bbc71>
- United States Environment Protection Agency. (2011). Protecting people and families from radon: A federal action plan for saving lives. Retrieved from [http://www.epa.gov/radon/pdfs/Federal\\_Radon\\_Action\\_Plan.pdf](http://www.epa.gov/radon/pdfs/Federal_Radon_Action_Plan.pdf)
- University of Minnesota. (2011). Radon risk assessment. Retrieved from <http://enhs.umn.edu/hazards/hazardssite/radon/radonriskassessment.html>

## Appendix A

# Radon and Lung Cancer: Information and Resources for Use in Oncology Clinical Practice

September 10, 2013

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*“I don’t know if it is a community or state or federal requirement or if it is just widely considered best practice. The radon thing could be, at least in MN, considered best practice to be addressed by all health care providers.*

Focus Group Participant, Metro MN Member, 2012

*“Lung cancer due to radon is a preventable disease. Our mission should be that we disseminate information about that.”*

Focus Group Participant, Metro MN Member, 2012

*I think it is great that we as a chapter have something specific that we sort of stand for or have a goal for or can present as part of as to why we are in existence*

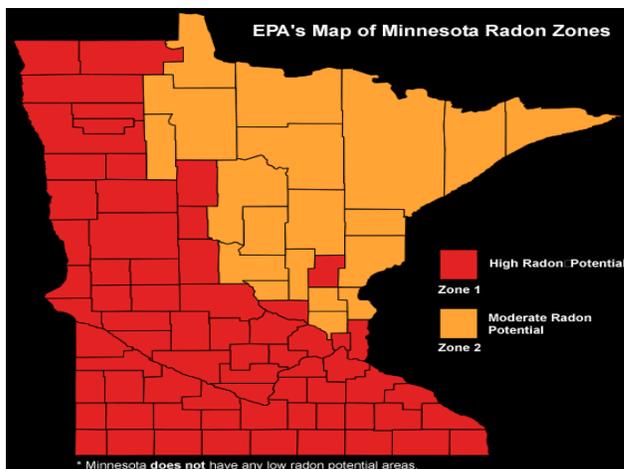
Focus Group Participant, Metro MN Member, 2012

## Introduction

The Radon Education Project (REP) included the development of a process to educate, create interest and develop recommendations for primary prevention strategies related to radon for oncology nurses in the Metro MN Chapter of the ONS. This white paper was developed based on input from Metro MN Chapter members who participated in the REP focus groups.

## Background

- Radon is a naturally occurring gas produced from the decay of uranium that is found in nearly all soil (MDH, 2010)<sup>1</sup>
- Radon flows from the soil into the air. Outside air typically has low concentrations; however, radon gas can also seep into homes where it is unable to disperse. This build up of radon gas within the home can then lead to higher concentrations. (National Research Council, 1999)<sup>2</sup>
- Radon is chemically inert. However, the radon atoms can spontaneously decay or change into other atoms called radon progeny. The radon progeny are electrically charged and can attach themselves to small dust particles. The dust particles can easily be inhaled into the lung.
- The deposited atoms emit alpha radiation that can disrupt DNA of the lung cells leading to one step in the development of lung cancer (National Research Council, 1999)<sup>2</sup>
- The map below shows average radon levels in the state



Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCi/L (picocuries per liter) (red zones)<sup>3\*</sup>

Zone 2 counties have a predicted average indoor radon screening level between 2 and 4 pCi/L (orange zones)<sup>3</sup>

Zone 3 counties have a predicted average indoor radon screening level less than 2 pCi/L (yellow zones)<sup>3</sup>

\*Environmental Protection Agency (EPA) recommends that all homes with radon levels of 4 pCi/L or more be mitigated.

## Significance

*Radon gas is the second leading cause of lung cancer in the U.S. with an estimated 21,000 deaths per year<sup>3</sup>*

- Approximately 15% of all lung cancers are attributable to indoor radon.
- Leading cause of lung cancer for non-smokers
- The combined effect of smoking and radon exposure is synergistic; therefore at equivalent exposure to radon, smokers will have a higher risk of developing lung cancer than non smokers<sup>4</sup>
- Environmental Protection Agency (EPA) recommends that all homes with radon levels of 4 pCi/L or more be mitigated
- Comparable risk at 4 pCi/L is 200 chest x-rays per year<sup>3</sup>
- Death risk to the average person from radon gas at home is 1,000 times higher than the risk from any other carcinogen or toxin regulated by the FDA or EPA<sup>3</sup>

*There is no known safe level of radon*

## Radon in Minnesota

Since radon gas is clear and odorless, individuals may be unaware of their exposure to this harmful gas.

Nationally elevated radon levels are in approximately one in 15 homes (US Environmental Protection Agency, 2013).

Nearly 80% of counties are rated high radon zones<sup>3</sup>

The Minnesota Department of Health (MDH) recommends that all Minnesota homeowners test their home for radon<sup>2</sup>

The radon test kit costs between \$5-\$25 and radon mitigation costs approximately \$800-\$2500<sup>2</sup>

*Due to the geology and how homes are built and operate in Minnesota, two in five homes have radon levels above the EPA action level of 4 pCi/L (MDH, 2010).*

## How can Oncology Nurses and other Health Care Professionals Help?

1. **Education of oncology nurses and physicians:** This document contains basic information on the health hazard associated with radon. Resources below also provide additional information for use in educating professionals so they feel confident in teaching patients/family members.
2. **Patient Assessment Form/Intake:** Patients complete a personal health assessment questionnaire/intake form. Consider asking them if they have ever tested their home for radon or do they know what the radon level of their home. If added to the form, it may provide an avenue for them to ask questions
3. **Access to data and information for patients:** Information should be available to educate patients and families
  - a. Add radon brochures from MDH to the clinic information center, patient resource center or patient library.
  - b. Provide an information board in the lobby. Consider picking a topic for the board for a month. This may generate patient questions. January is radon action month and November is lung cancer awareness month.
  - c. Consider the timing of education. Some patients would be open to receiving the information on radon immediately and others would be overwhelmed with the new information. This education should be individualized and education on radon may be best in a survivorship clinic.
  - d. Topic of discussion or informational booth at support group, survivorship conference or volunteer activity
  - e. Consider ways to enhance community involvement and primary care involvement
  - f. MDH also recommends having bookmarks and test kit order forms available and to utilize the Star Tribune portal to provide zip code data to the community [www.startribune.com/local/190554621.html](http://www.startribune.com/local/190554621.html)
  - g. Consider using one of the MDH radon posters for your information board <http://www.health.state.mn.us/divs/eh/indoorair/radon/sirg.html>

## Benefits of Oncology Nursing Society (ONS) Involvement

- Organization promotes awareness and teaching. Metro MN ONS endorsing and promoting this work would provide credibility
- Information is relevant to health care providers both personally and professionally

## Resources/Websites

1. Minnesota Department of Health: Radon in MN homes. The primary portal for radon in MN: [www.health.state.mn.us/radon](http://www.health.state.mn.us/radon)
2. Minnesota Department of Health: Resources for Medical Providers <http://www.health.state.mn.us/divs/eh/indoorair/radon/medical.html>
3. A Breath of Hope Lung Foundation: <http://www.abreathofhope.org/>

4. CanSAR: Cancer Survivors Against Radon: <http://www.cansar.org/>

### **Test Kits and Brochures**

1. Radon Testing Procedure and information: [www.health.state.mn.us/radon](http://www.health.state.mn.us/radon) (pick radon testing or radon test kits)
2. Minnesota Department of Health: Radon Brochure has information on radon testing and mitigation. available on-line, also as a pdf, and hard copy can be ordered (for free from MDH, as supplies last). A shorter bookmark is also available for mass distribution: [www.health.state.mn.us/radon](http://www.health.state.mn.us/radon)

### **References**

1. Minnesota Department of Health (MDH): (2010) State Indoor Radon Grant Report Minnesota: Radon Resistant Toolkit [www.health.state.mn.us/divs/eh/indoorair/radon/sirg.html](http://www.health.state.mn.us/divs/eh/indoorair/radon/sirg.html)
2. Minnesota Department of Health (2011) Radon: Keeping your home safe from Radon. Retrieved from [www.health.state.mn.us/radon](http://www.health.state.mn.us/radon)
3. Minnesota Department of Health (2013): How serious a problem is radon in Minnesota? Retrieved from [www.health.state.mn.us/radon](http://www.health.state.mn.us/radon)
4. National Research Council. Committee on the Biological Effects of Ionizing Radiation (BIER VI). Health Effects of Exposure to Radon Washington, DC: National Academy Press; 1999.
5. University of Minnesota: Radon Risk Assessment 2011 Retrieved from <http://enhs.umn.edu/hazards/hazardssite/radon/radonriskassessment.html>
6. Copes, R. & Scott, J. (2007) Radon Exposure: Can we make a difference? Canadian Medical Association Journal, 177(10), 1229-1231
7. Nissen, M. J., Leach, J. W., Nessen, J. A., Swenson, K.K., Kehn, H. (2012), Radon Testing and Mitigation: an Intervention in Primary Care Setting. *Journal of Cancer Education*, pp. 566-72. doi: 10.1007/s13187-012-0346-z

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This is the first work demonstrating oncology nurses partnering with the Minnesota Department of Health in a formalized programmatic approach on radon safety education.