RADON:
An Opportunity for Prevention

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Radon:
An Opportunity for Preventative Health

- Radon is a colorless and odorless radioactive gas that is produced by the naturally occurring decay of the element uranium found in rock and soil (1)
  - The natural release of radon gas from rock and soil permeates air, groundwater and surface water (2)
- Long-term residential exposure to radon positively correlates with lung cancer risk (3)
  - Radon from the soil is known to move up from the ground through cracks in the foundation and permeate the air where, without adequate ventilation, it becomes trapped and accumulates over time (1)
  - One in eight Vermont homes contains unsafe levels of radon gas (1)
  - Without testing, there is no way to detect the presence of radon in the home (1)
- Exposure to radon is the leading cause of lung cancer among non-smokers, and the second leading cause of lung cancers after smoking (4)
  - Radon exposure alone causes an estimated 21,000 lung cancer-related deaths per year in the United States (4)
- Children exposed to unsafe levels of radon are considered particularly vulnerable to the future development of lung cancer because smaller lungs and faster respiratory rates are thought to result in higher radiation doses from radon compared with adults (2)
- The EPA recommends action to mitigate radon exposure in any building in which radon is measured to be at or above 4 pCi/L of air (5)
- Free Radon Air Test Kits available from the Vermont Department of Health are an underutilized resource, suggesting that public awareness of radon and its associated health risks is insufficient
  - Discussion of radon and its associated health risks should be integrated into preventative medical care, particularly with pediatric patients
  - Increased knowledge of radon correlates with increased likelihood to test for and abate elevated radon levels (6)

Implications of Cost

- The Vermont lung cancer mortality rate is higher than the national average at 47.7 compared to 44.7 / 100,000 people respectively (7)
- There are more than 500 cases of newly diagnosed lung cancer / 100,000 people each year in Vermont
    - With an estimated 370 annual deaths per 100,000 people (7)
- The estimated cost of treatment for lung cancer is over $92,000/patient/year (8)
- In comparison, long-term radon air test kits are available for free from the VT Department of Health
    - They have distributed over 48,000 air test kits to VT residents (9)
- The one-time installation cost of a home radon abatement system ranges from $1,000 - $2,000 on average (9)
- Of the homes tested above 4 pCi/L, only 42% have had abatement systems installed (9)
- This is a missed opportunity for preventative health and economic relief

Community Perspectives

Local Community Parent

Participant in a focus group about radon awareness (name withheld)

- “It was a brand-new construction home so we never tested it [for radon] thinking that it was fine. And for whatever reason the bank didn’t require it so we never had the test done. ... I have to admit I’m concerned about what we’ve exposed our children to.”
- “In Vermont I heard one in four houses have radon exposure. So how many of your neighbors are living with it and don’t know? And then they show up with lung cancer ... but they’ve never smoked.”
- “I think the challenge becomes the awareness of what is radon and what are the short term and long term effects of exposure to radon. We’ve heard a lot for years about lead based paint and how to avoid that. Families are aware of that. You read about it, pediatricians bring it to your attention. That may be another avenue to become informed about radon. If you’re pushing it through the pediatrician pipeline that awareness trickles. .... I don’t think there’s much awareness around radon yet.”
- “If you can work the pediatrician channel this is a fantastic way of getting more bodies behind the cause. Parents are true advocators for their children and they will do everything possible to keep their children safe.”

Easter Division Director of Health Promotion

American Lung Association (name withheld)

- “I believe that pediatric practices are a great place to start and assume there would be a ripple effect if enough clinics were addressing this topic. The challenge, as always, is finding the time to discuss in a standard visit.”
- “I wonder if radon screening could be embedded in the EMR? I assume that’s a heavy lift, but given the public health impact, it seems like it should be.”
- “I believe the most important topics [for community awareness] are:
  - *1. Radon exposure is the leading cause of lung cancer among smokers, and second over all*
  - *2. Testing is FREE and every home owner should have their home tested.”*

Intervention and Methodology

- The intervention is aimed at creating an educational resource for parents and families that enables physicians to easily and efficiently discuss:
  - The established health risks of long term exposure to radon
  - Inquire about whether the home has been tested
  - Offer information about how to have the home tested and abated
- The intent of this project is to generate a practical and useful tool to help physicians educate their patients about radon without unnecessarily encumbering already time-constrained encounters
- I have created an educational resource document within EPIC accessed via smart phrase that can be rapidly added to the Patient Instructions portion of the summary encounter.
  - The hope is that this document will encourage physicians to introduce the topic and give them an easy way to send the patient home with more information
- The resource document addresses the following pertinent topics:
  - What is radon and how does it enter the home
  - Associated health risks of exposure to radon
  - What steps to take to have the home tested and abated in Vermont
  - Suggested resources for additional information if desired
- This smart phrase was made available to the resident physicians of the Milton Family Practice clinic with the intent that it will be used initially at all well child checks and eventually expanded to preventative health visits for patients of all ages
- I believe that a resource document built into EPIC will be more useful and sustainable than a brochure or poster

Radon Resource Document:

- Intended to be rapidly accessed by providers via smart phrase within EPIC and added to the Patient Instructions portion of the After Visit Summary

Radon: A Cancer-Causing Radioactive Gas
Information & Available Resources

What is radon:

1. Radon is a colorless and odorless radioactive gas
2. Radon gas is produced by the breakdown of the element uranium
3. This occurs naturally in soil and rock worldwide
4. When the gas is released from the ground it enters the air

Health risks associated with radon:

1. Breathing air that contains high levels of radon is known to cause lung cancer
2. In fact, exposure to radon is the leading cause of lung cancer among people who do not smoke
   a. Children are especially vulnerable because their smaller lungs and faster breathing rates may result in larger doses of radiation compared with adults
3. After smoking, radon is the second leading cause of lung cancer overall
4. Exposure to radon is estimated to cause 21,000 lung-cancer related deaths in the United States each year

Radon in the home:

1. 1 in 8 Vermont homes contains unsafe levels of radon gas compared with 1 in 15 homes nationally.
   a. This is almost double the risk of unsafe radon exposure to Vermont residents!
2. Radon gas can enter the air in your home, where without adequate ventilation, it can become trapped and build up overtime
3. Without testing, there is no way to detect the presence of radon in your home
4. But this can easily be fixed!

Having your home tested for radon:

1. Testing your home is the only way to know if you and your family are at risk of radon exposure
2. Testing is easy in Vermont!
3. FREE radon test kits are available to all Vermont residents
4. You can request one from the Radon Program by:
   a. Calling 800-439-8550 (toll free in Vermont)
   b. Or, emailing radon@vermont.gov

Fixing the problem:

1. If the radon in your home is measured to be at or above 4 pCi/L of air, it should be evaluated and fixed by a professional
2. A professional radon specialist is licensed to install a radon removal system in your home, providing long-term protection from exposure to radon
3. A list of local radon specialists is available at the National Radon Safety Board website:
   a. http://www.nrsb.org/

For more information, check out these resources:

1. Vermont Department of Health - http://www.healthvermont.gov/radon
2. Environmental Protection Agency - https://www.epa.gov/radon

Results & Qualitative Response

- The time constraints of this project precluded the ability to collect quantitative data. However, mechanisms for future data collection include:
  - Measuring the percentage of wellness encounters in which the topic of radon is discussed
  - Measuring the frequency with which the resource document is included in the After Visit Summary
  - Seeking patient feedback about the delivery of information and the utility of the resource document
- Qualitative feedback from providers at the clinic was positive. Specifically in terms of:
  - Appropriate simplicity of language for a variety of education levels
  - Concise and direct resource document containing pertinent and not extraneous information
  - Emphasizing Vermonters increased risk of exposure compared with average national risk
- Suggestions include:
  - Making the smart phrase available system-wide in EPIC rather than confining to Milton Clinic
  - Writing a health editorial for the local Milton newspaper as an additional means for promoting radon awareness
- Qualitative feedback from the VT office of the American Lung Association was also positive and stressed the importance of emphasizing:
  - The particular vulnerability of children to long term radon exposure due to higher radiation doses
  - Reinforcing that people understand it is FREE to have their homes tested

Effectiveness and Limitations

- This project promoted awareness of radon and its associated health risks among the providers at the Milton Family Practice.
- It also created a tool for integrating the topic into general wellness encounters in an easy and efficient means for providers to give patients information to bring home
- Limitations of this project are that it did not collect any specific data.
    - Recommendations for future quantitative data collection are included on the previous “Results” slide.
- Long term, this intervention will be limited by the time constraints of patient encounters and the already abundant scope of prevention topics requiring attention
- Furthermore, as the VT Dept. of Health data suggests, there is still the troublesome issue of how to ensure that families who test above 4 pCi/L in their home will follow through with the abatement process

Future Recommendations

- Create additional radon educational opportunities for providers such as resident lectures and grand rounds presentations
- Raise community awareness about radon by writing a health editorial for the local newspapers
- Build radon screening into the preventative health encounter template in EPIC
- Make radon air test kits readily available at Family Practice and Pediatric clinics across the state for ease of distribution
- Involve the Community Health Teams with promotion of radon awareness
- Elicit patient feedback about the utility of the resource document
- Consider how to support financially limited households with the expense of abatement

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