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# Radon: The New Carbon Monoxide

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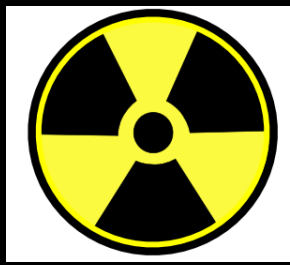
# Radon: The New Carbon Monoxide

Katherine M. Evans

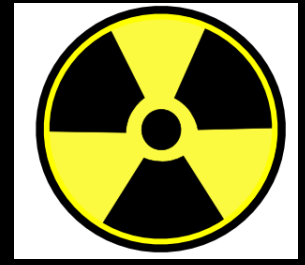
February-March 2015

Brattleboro, VT

Robert Tortolani, MD



# Radon: Why Care?



- Derived from breakdown of uranium naturally found in the environment all across the globe
  - Some geographic locations have higher levels of radon than others
- Like carbon monoxide, radon is colorless, odorless
  - Requires a special testing apparatus for detection
  - Recommend radon levels to be less than 4 pCi/L
  - 1 in 8 homes in Vermont exceed this level
- Human exposure happens primarily via buildings
  - Radon seeps from soil into the air inside buildings, where unable to escape, it accumulates
- 2<sup>nd</sup> largest source of ionizing radiation → health hazard
  - Inhaled particles damage respiratory tract
  - Prolonged exposure is carcinogenic
- 2<sup>nd</sup> leading cause of lung cancer in the USA
  - Approximately 21,000 deaths from lung cancer secondary to radon
  - Smokers exposed to radon have an 8-fold increased risk of lung cancer

# Radon in Brattleboro?

- Radon levels in Brattleboro reach statistical significance in exceeding the state average
  - Across Vermont, 1 in 8 homes exceed recommended level
  - In Brattleboro, 1 in 5 homes exceed recommended level
- Vermont Department of Health offers free home testing
  - Between January 1993 and January 2014, the VDH received only 329 home testing kits from Brattleboro (population: ~12,000)
- Little public awareness of health consequences of radon
- This project aims to promote patient education and facilitate acquisition of home radon testing kits via area Family Medicine practices



# Public Health Cost of Radon

- Home radon reduction system: \$800-2,500
- 1 year lung cancer treatment: \$18,000-60,000
- Vermont lung cancer cases per year: 260
- Vermont lung cancer deaths per year: 185
- Brattleboro lung cancer cases per year: 88
- Approximately 50 Vermonters die each year from radon-induced lung cancer

# Brattleboro Radon Testing Statistics

- VDH sends reminders to deploy and return kits for analysis
- Testing kits are functional for two years and are deployed for up to 12 months
  - Some do not deploy kits immediately
  - Thus, data for 2013 and 2014 are not yet complete

Year	Kits Distributed	Kits Returned
2014	24	
2013	15	
2012	16	11
2011	25	18
2010	83	55

# Perspective from [Name Withheld], PhD

Environmental Health Surveillance Chief, Vermont Department of Health (VDH)

- Barriers to home radon testing
  - *“Vermonters first need to care about radon; there is a huge awareness gap. I would recommend that physicians ask about home radon testing on patient intake forms.”*
  - Difficult to motivate as there is a long latency period between exposure and health manifestations. *“There is no poster child in Vermont for radon exposure.”*
  - VDH radon awareness efforts have been met with poor community participation
- Radon and Smoking
  - *“Smokers are the population most vulnerable to radon.”*
    - Among smokers, radon exposure plays a role in the development of lung cancer in about 85% of cases
    - *“Many of these are people who die of lung cancer who otherwise wouldn’t [if they had not been exposed to radon].”*
  - This complicates radon awareness issues, as one of the best ways to avoid the deleterious effects of radon is to not smoke.
    - Smoking cessation becomes central to addressing radon as a public health concern
    - Historically difficult to garner public support for lung cancer, as smokers tend to be blamed for bringing their illness upon themselves
- Barriers following home radon testing
  - Not all who request the kit return it to VDH for analysis
  - Not all homes with high radon levels are treated.
    - Only 30-40% mitigate within one year
    - Only 25% have concrete plans to mitigate
    - 35-45% will not mitigate; likely related to high cost

# Perspective from [Name Withheld], MS

Brattleboro District Director, Vermont Department of Health (VDH)

- Radon awareness
  - January is national radon awareness month
    - Interview with local radio station about the importance of testing for radon
    - *“It is surprising to people that radon actually is the second leading cause of lung cancer, after smoking.”*
  - Major campaign efforts are largely driven by access to program funding
    - When grants are not available, issues which have immediate consequences take priority
  - Reaching out to elementary school children is one of the most successful ways to educate Vermonters about radon
    - Children design radon awareness posters which are displayed by the VDH
    - Teachers are given tools to provide education about radon
- Frequency of home radon testing
  - Only need to test once
  - No need for periodic radon testing
- Barriers to radon mitigation
  - Can be costly, depending on the state of the building
  - *“Unfortunately, there is no financial assistance for low income Vermont homeowners who need to mitigate radon.”*



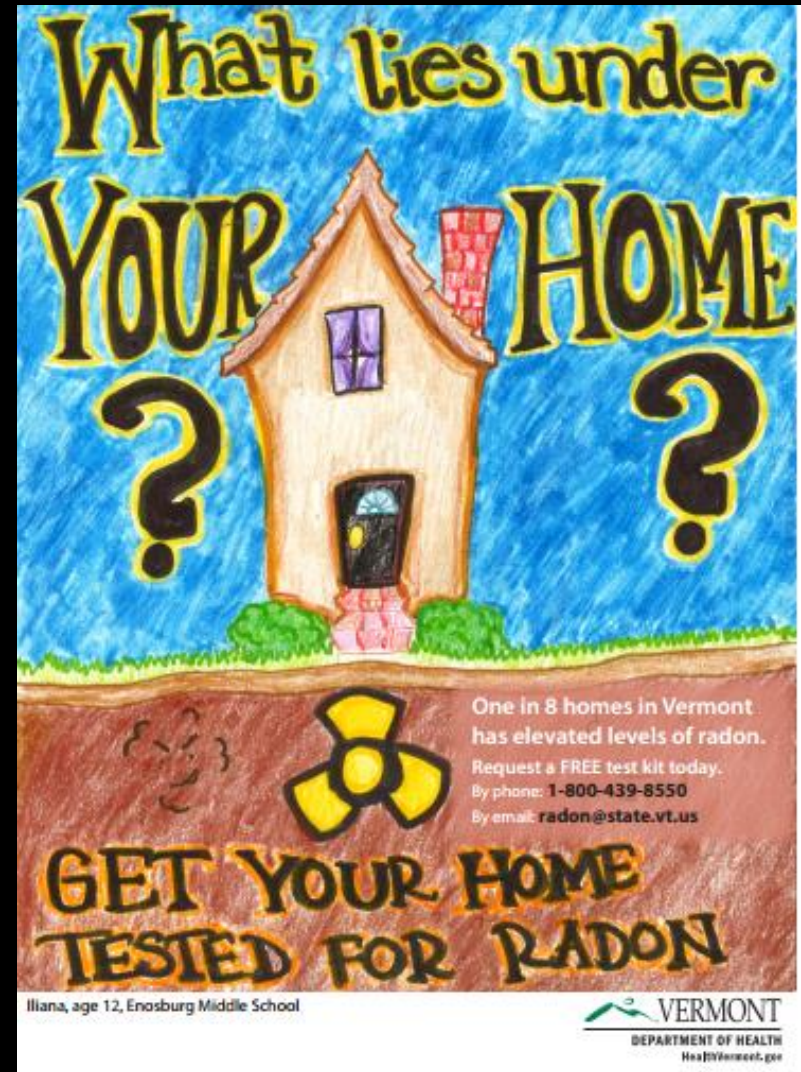
# Intervention & Methodology

- The intervention was aimed at promoting patients of Brattleboro Family Medicine physicians to obtain the free radon home testing kits from the Vermont Department of Health (VDH)
- This project was pilot tested in [the doctor]'s office
  - Provided brief education to patients within the context of an office visit
  - Posted VDH radon awareness posters, along with radon testing kit request forms, in 7 local Family Medicine offices
  - Office available to fax completed testing kit request forms to the VDH
- Subsequently, I presented this project at meeting of local Family Medicine physicians, of whom 7 agreed to incorporate this project into their offices

# Sample Patient Education and Poster

## **RADON is the new CARBON MONOXIDE**

- Like carbon monoxide, radon is undetectable
- Radon is the 2<sup>nd</sup> leading cause of lung cancer
- Brattleboro has one of the highest levels of radon in the state of Vermont
- About 1 in 5 homes will have too much radon
- Test your home today! It's free and easy!



# Response & Results

- VDH enthusiastically supported this project
- Local Family Medicine physicians were glad to have resources regarding radon and testing kits available to patients
- Qualitatively, physicians reported that patients were very interested in obtaining home testing kits from the VDH
- As per their protocols, VDH continues to track the number of testing kits requested from Brattleboro residents
  - Determining the return rate of these kits is delayed as home testing takes up to 12 months

# Effectiveness & Limitations

- This project achieved the goal of raising awareness of radon and encouraging patients to test for radon
- The VDH carefully tracks the number of radon testing kits requested and returned
  - The short duration of this rotation limits the ability to quickly collect meaningful data
  - Over time, VDH data will enable us to evaluate the efficacy of this project
- The implementation of this project is partially limited by physician knowledge, motivation, and time to briefly educate patients
  - This project worked to overcome this by hanging radon awareness posters, though verbal communication tends to be more effective and motivating than visual

# Recommendations

- Expand the scope of project to include other medical specialties
- Provide formal education for physicians regarding radon, as knowledge base may be lacking
  - Grand Rounds
  - Medical Staff Meetings
- Encourage physicians to question patients about their exposure to radon
  - Inquire about radon testing in annual physical exam
    - Add to patient survey or to EMR
- Incorporate the topic of radon in ongoing smoking cessation programs

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