

RADON EXPOSURE

2019 Healthy Homes Conference

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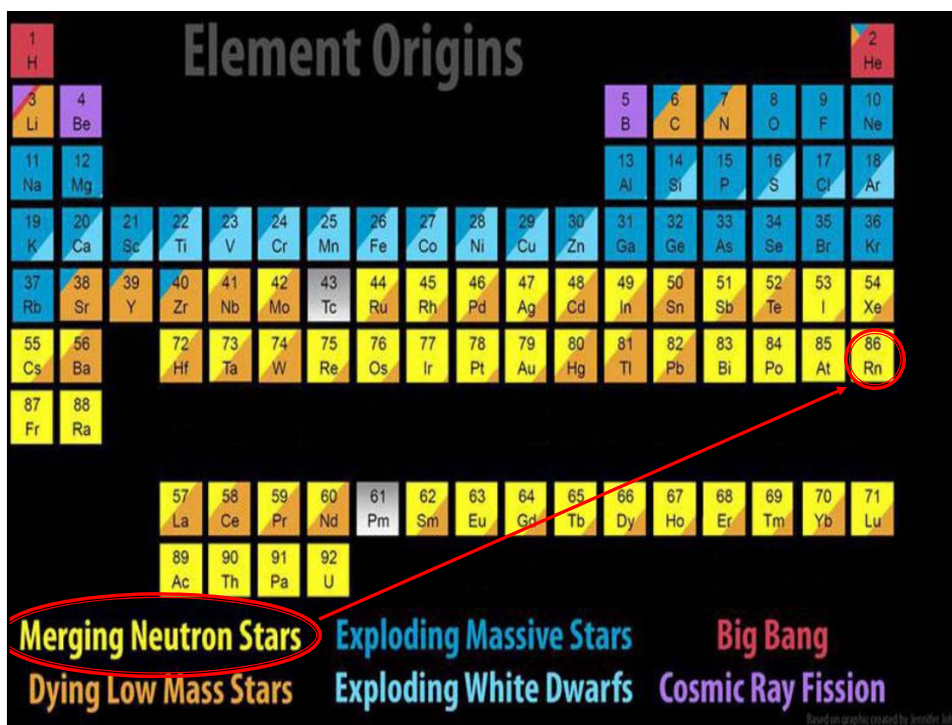
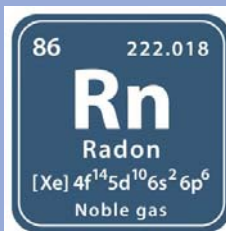
What You Will Learn Today?

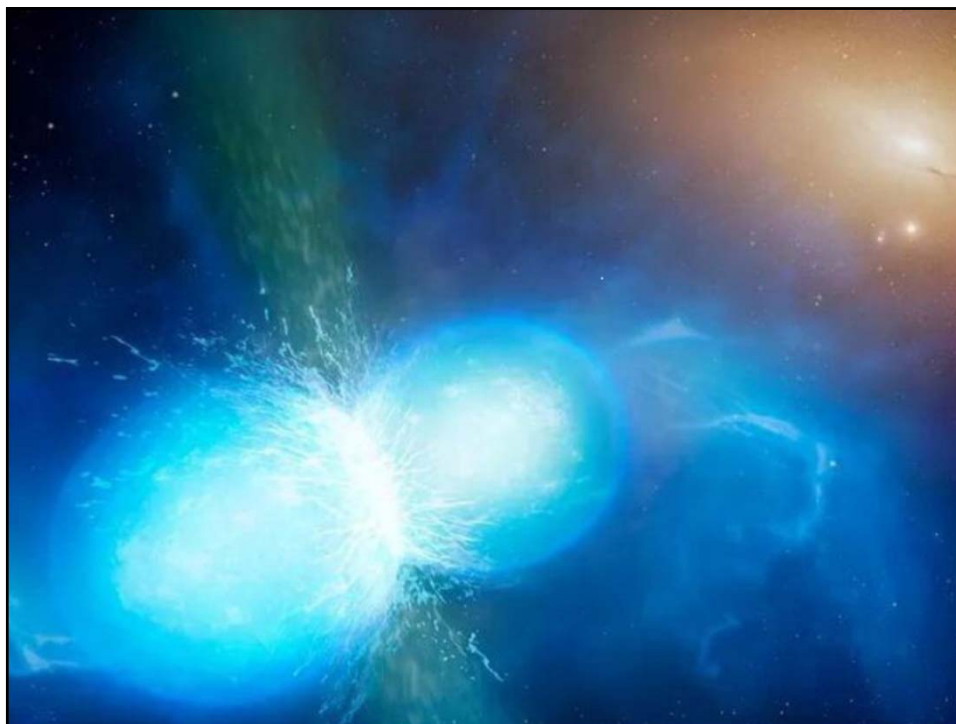
- What is radon?
 - Air and water
- What are the know health risks of radon?
- How can I test for radon?
- How can I reduce radon in my home or school?



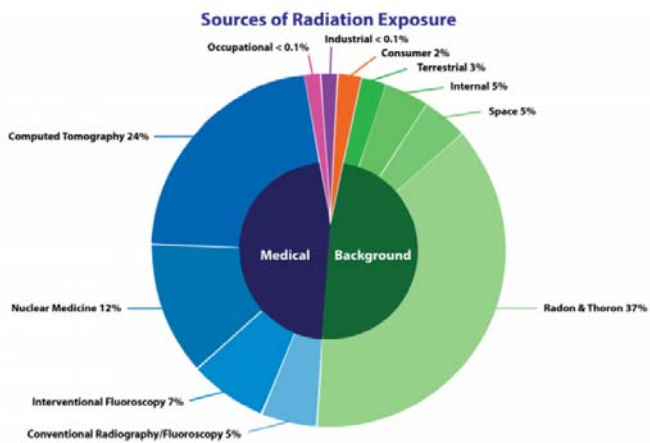
Properties of Radon

- Radioactive
 - unstable, it wants to change
- Naturally occurring
 - Always some level of Radon
- Nobel gas
- No odor, no taste, no color
 - Only way to know you have it is to test for it





Radon is the Largest Exposure of Natural Radiation



What are the Health Risks of Radon?

- Lung cancer through inhalation

Surgeon General Health Advisory

“Indoor radon is the second-leading cause of lung cancer in the United States and breathing it over prolonged periods can present a significant health risk to families all over the country. It is important to know that this threat is completely preventable. Radon can be detected with a simple test and fixed through well-established venting techniques.

January 2005



What are the Health Risks of Radon?

- Lung cancer from inhalation of radon
- Stomach cancer through ingestion of water
- Other cancers are being studied



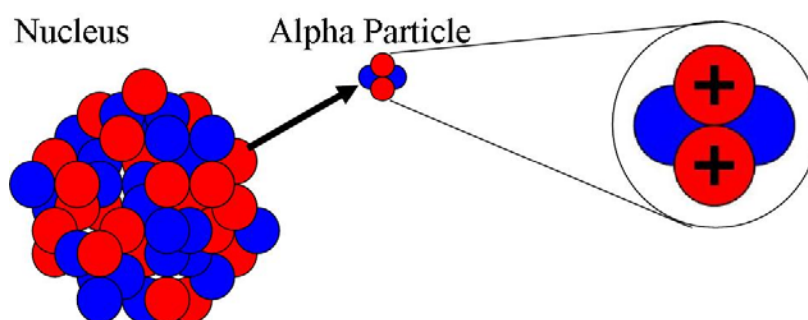
Radon is a Serious National Health Problem

- Environmental Protection Agency
- American Lung Association
- National Academy of Sciences
- World Health Organization
- Health Canada
- Public Health England



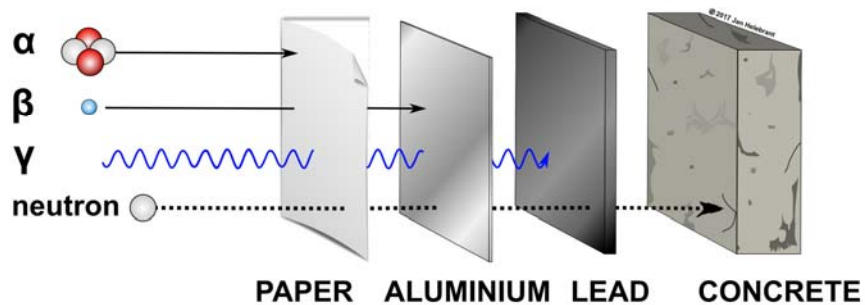
How Does Radon Cause Cancer?

- Radioactive decay products emit Alpha radiation



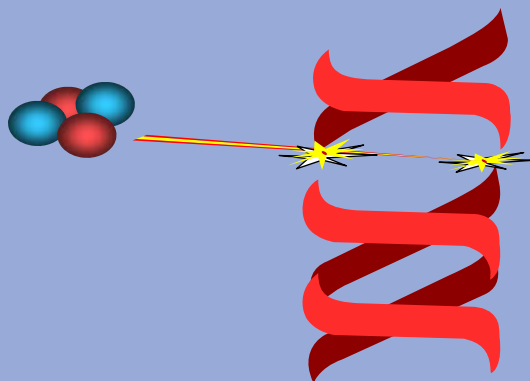
Penetrative Power of Different Types of Radiation

Penetrating power of different types of radiation

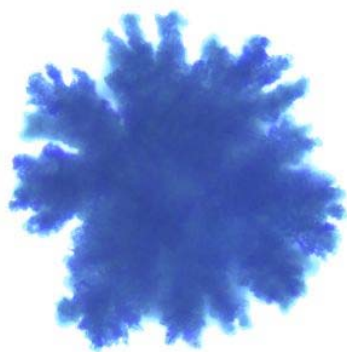


Alpha Particles Damage DNA

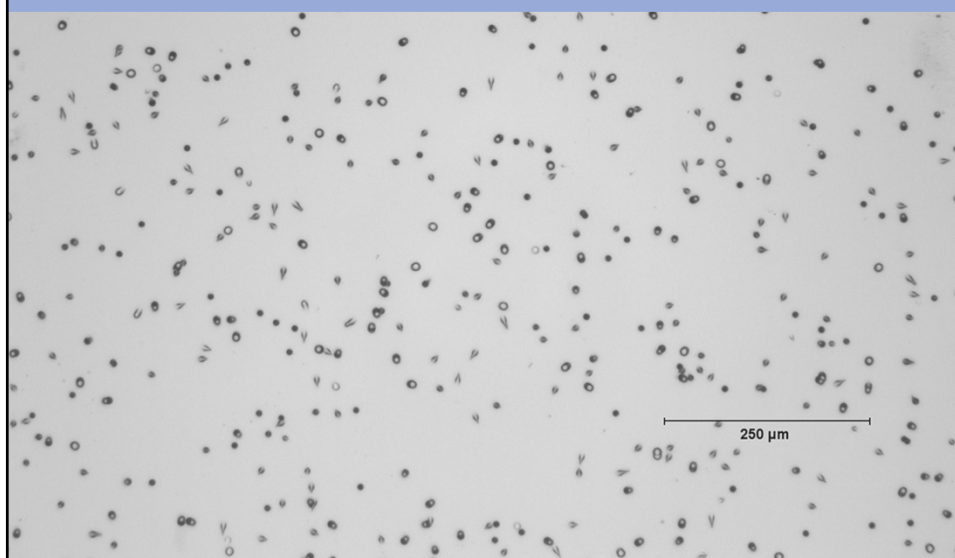
- This can lead to cell mutation and cancer

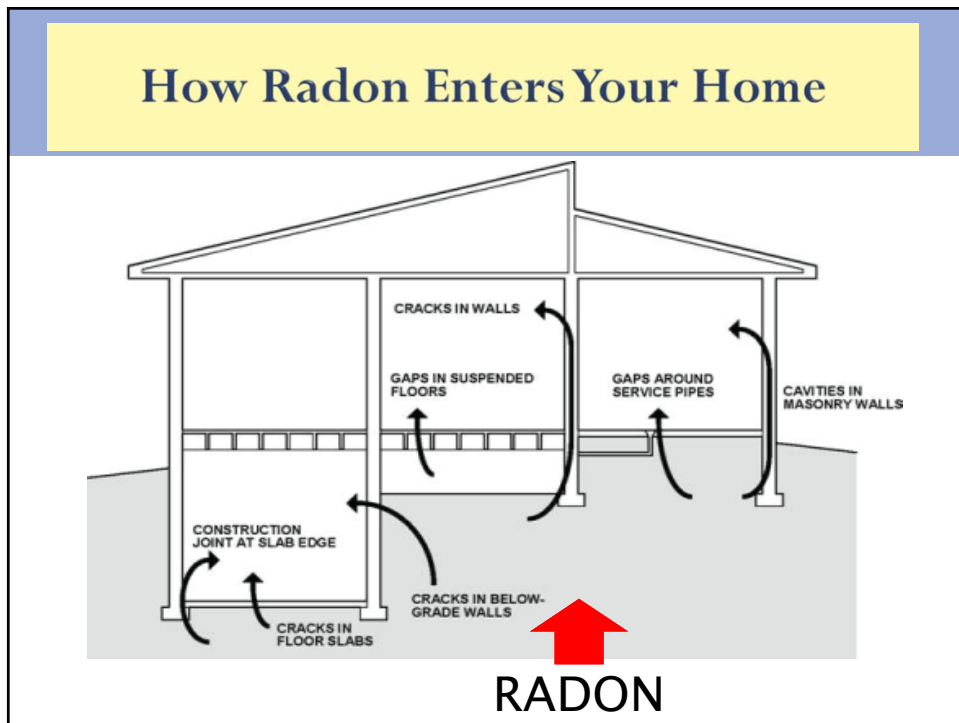
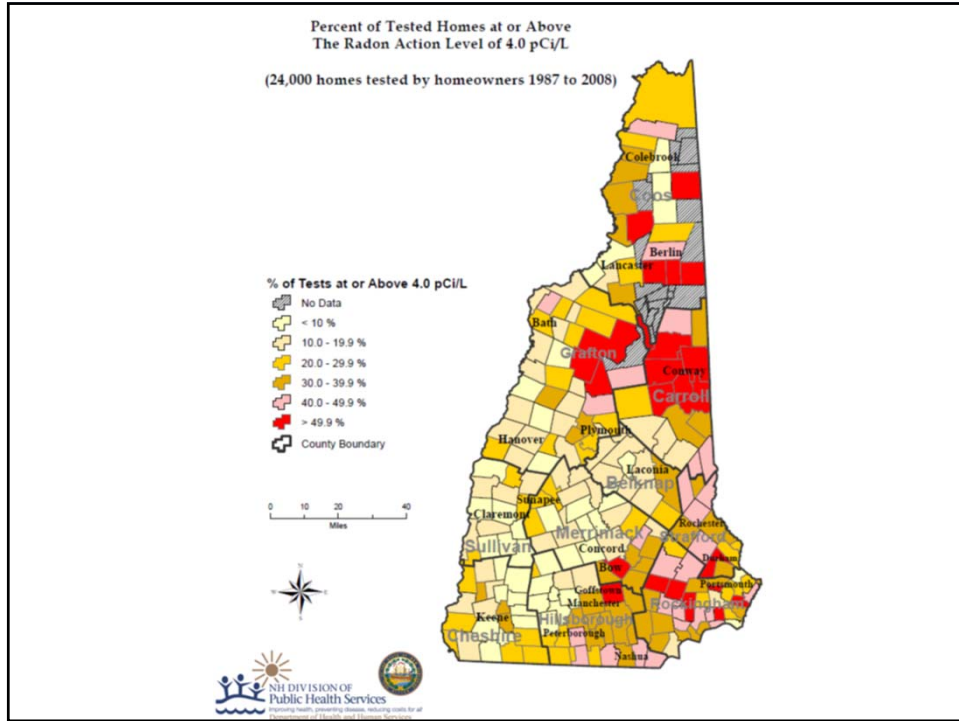


Alpha Particles Impact



Alpha Particles Impact on CR 39 Plastic





Short and Long-Term Testing

- Short term testing
 - 48 hours to 90 days
- Long term testing
 - 91 days or more



Short-Term Testing

- Advantages
 - Quick screening method
 - Easy to use
 - Inexpensive
 - No power requirement
- Disadvantages
 - Influence by environmental conditions
 - Short testing period





Long-Term Testing

- Advantages
 - Better “average” radon level
 - Environmental conditions not an issue

- Disadvantages
 - Takes longer
 - Devices can be forgotten about or lost
 - Not as good for low concentrations of radon





Testing Protocols

- Duplicate tests required
 - Short term
- 48 hour minimum
 - Short term
- Lowest livable level
- Avoid severe weather
 - Short term
- Low traffic rooms, away from drafts, extreme heat, high humidity, and direct sunlight

Testing Protocols

- If hung from ceiling, hang at least 20" from ceiling
- At least 20" from the floor
- More than 3' from exterior doors, windows or other openings to the outside
- 12" or more from exterior walls
- At least 4" from other objects such as another testing device




What is the Action Levels for Radon in Air

- 4 picocuries per Liter - **4pCi/L**
 - Based on available technology to reduce radon, not just a health risk



**Reducing Airborne Radon in
Your Home**

Active Sub-Slab Depressurization



The logo for the University of Public Health Services is located in the bottom left corner of the slide. It features a stylized sun and human figures, with the text "UNIVERSITY OF Public Health Services" and a tagline below it.





Reducing Airborne Radon in Large Buildings

HVAC Adjustments/Balancing



Radon Resistant New Construction

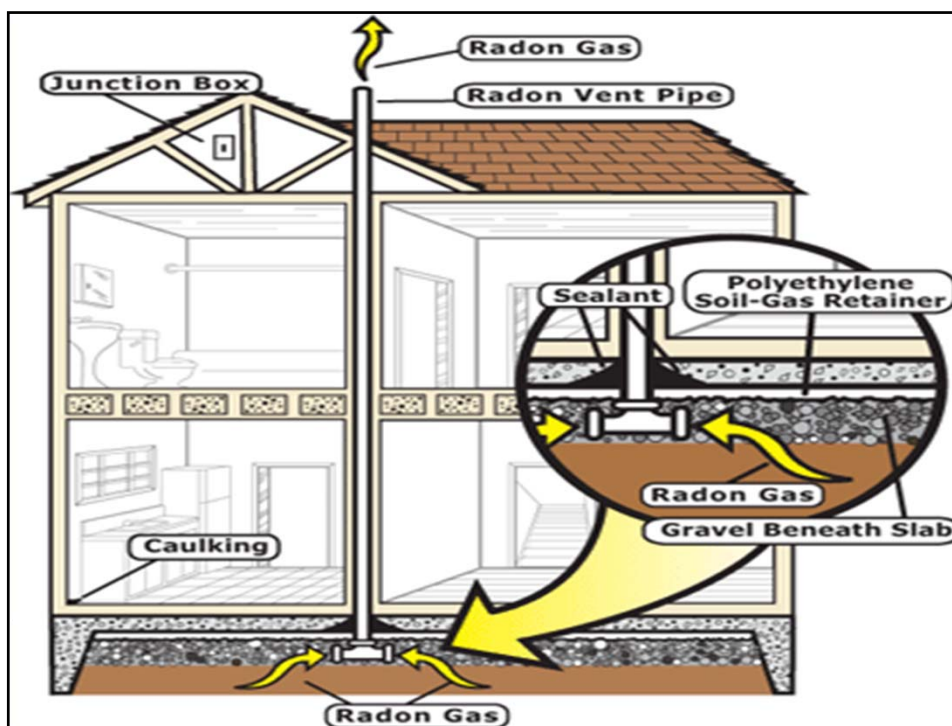
- Most effective way to address radon
- Build in radon resistant and reduction measures
- Still need to test to confirm low radon levels when home construction is finished



Radon Resistant New Construction

- Radon reduction designed HVAC systems
- 4" layer of gravel under the foundation
- Install vapor barrier
- Passive depressurization system
- Install radon fan if needed





Radon in Water

- Ingestion of radon in water has a much lower health risk
- Inhalation risk from water depends on level of radon in water
- For every 10,000 pCi/L of radon in water about 1 pCi/L gets into air
- Health risk from radon in water is lung cancer (inhalation) and stomach cancer (ingestion)

Radon in Water Sample Collection

- Remove aerator and screen from faucet
- Run water for 5 minutes
- Use a glass vial with a Teflon lined septum
- Fill sample vial to just above the top
- Replace cap and avoid having bubbles in the sample
- Mail or take sample to lab



Radon in Water Mitigation

- Aeration
 - Bubbles or sprays water to release radon which is then vented outside above roof of home
- Granular Activate Charcoal (GAC)
 - Traps radon in charcoal (not recommended for high levels of radon due to radioactive build up in filter)





What Have You Learned?

- Radon causes cancer
- Radon can easily be reduced
- Test your home or school for Radon

Nationally Certified Radon Measurement & Mitigation Professionals

National Radon Safety Board

<http://www.nrsb.org/find-a-pro/>

AARST-National Radon Proficiency Program

<http://aarst-nrpp.com/wp/certification/database-search/>



Questions?

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