Radon and Respiratory Health: Addressing Hidden Housing Hazards in Health Center Communities

NATIONAL NURSE-LED CARE CONSORTIUM
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NCHPH

February 12th, 2026 | 1 pm EST

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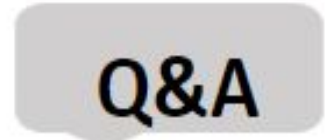

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-training and technical assistance
-public health programing
-consultation
-direct care

To learn more about NNCC, please visit our website at www.nurseledcare.org.

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NCHPH

National Center for Health in Public Housing

- **Who we are:** Established in 2001, NCHPH provides technical assistance to enhance the capacity of Public Housing Primary Care (PHPC) health centers and other health centers that want to provide primary care to residents of public housing, with the goal of assisting health centers in meeting program requirements, improving performance, supporting program development and data analysis.
- **Our mission:** To provide training, technical assistance, data analysis, partnership building for health centers to support improved health outcomes for residents of public housing.

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Today’s Agenda

5 min - Welcome

10 min - Nate Burden, Radon Scientist and Consultant

- What is radon?
- What health centers need to know
- HUD’s role in mitigation

20 min- Nate Burden, Radon Scientist and Consultant

- Health impacts of radon exposure
- Educating patients on risks

10 min- NCHPH

- Screening, education, and mitigation strategies for health centers

10 min - Questions & Wrap-Up

Learning Outcomes

By the end of this webinar, participants will be able to:

- Discuss the serious health risks associated with radon exposure and its impact on community health
- State how radon contributes to chronic conditions like Chronic Obstructive Pulmonary Disease (COPD)?
- COPD and Congestive Heart Failure increase the risk of developing lung cancer
- Describe prevention and mitigation strategies for better health outcomes

RADON: A PREVENTABLE INDOOR AIR QUALITY RISK FOR THE BUILT ENVIRONMENT: A FOCUSED TRAINING, ASSESSMENT, AND RECOMMENDED ACTIONS/SOLUTIONS PRESENTATION

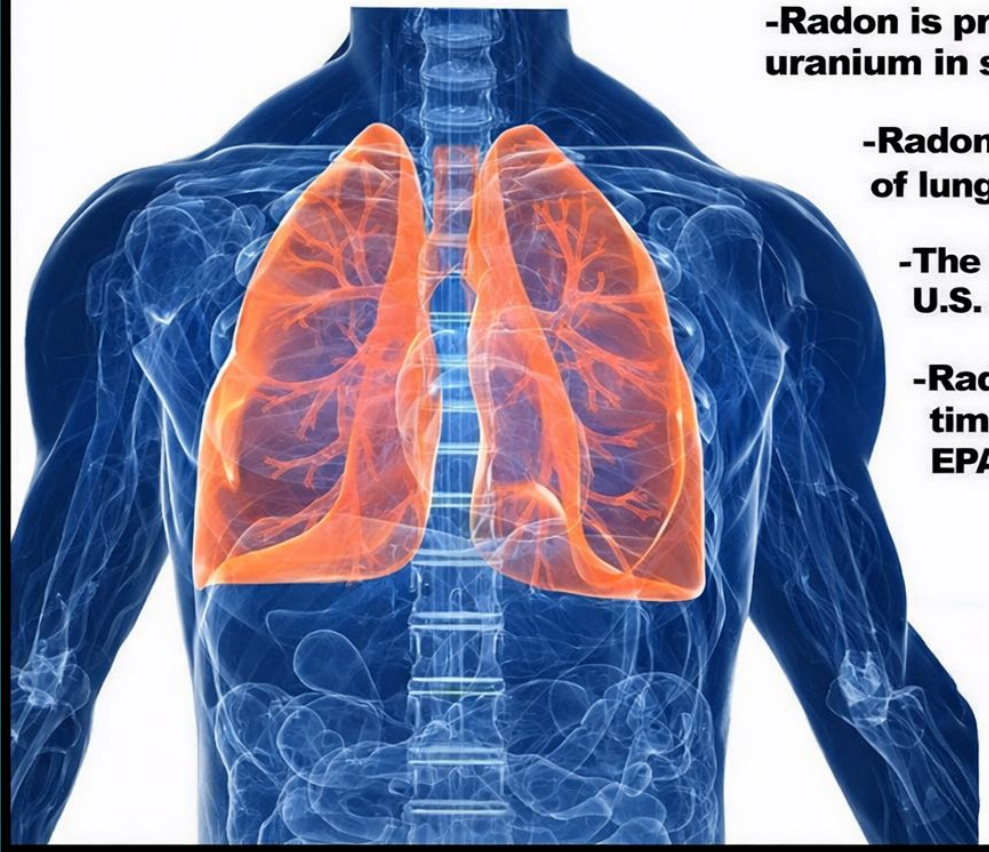
Presenter: Nathaniel L. Burden, Jr.,
nateburden@msn.com

- **Radon Scientist, National Radon Training Instructor (Spruce Environmental)**
- **PA DEP Radiation Protection Advisory Committee member**
- **Pennsylvania Chapter President & sit on Board of Directors: Indoor Environments Association dba American Association of Radon Scientists and Technologists (AARST)**

Pathway of Prevention

Radon Facts

What is Radon? It is an odorless, colorless, tasteless radioactive gas scientists and doctors have proven can cause cancer.



-Radon is produced by the breakdown of uranium in soil, and rocks

-Radon is the second leading cause of lung cancer in the United States today

-The EPA says 15 percent of homes in the U.S. have unsafe radon levels

-Radon carries approximately 1000 times times the risk of death as any other EPA carcinogen

Source: U.S. Environmental Protection Agency (EPA); Centers for Disease Control and Prevention (CDC)

RADON 101 REVIEW

- Why is this **radioactive toxic radon gas pollutant** in our homes, schools, workplaces, and childcare facilities a big deal?
- This radioactive toxic pollutant can cause lung cancer and other health risks to us and our children.
- If this is such a danger to us and our children, why is it not a priority to everyone?
- Why is radon testing not required for all homes, schools, workplaces, and childcare facilities (**BUILT ENVIRONMENT**)?
- **THE ANSWER IS BECAUSE RADON IS INVISIBLE!!!!**

RISK PERCEPTION IS THE PROBLEM

PERCEPTION, MANY TIMES IS REALITY

- Can't see it
- Can't smell
- Can't taste it or feel it
- In many minds of the public and us, the radon risk is not truly real!
- It is not on the public's radar
- Because the risk is not perceived or believed, does the danger and it's consequences disappear

Radon Threat Is Invisible, Tasteless, and Odorless, But If..

https://www.rd.com/list/hidden-signs-of-toxic-mold/?utm_source=chatgpt.com

Radon offended the senses, people would more likely to test and mitigate.

Radon does not impact the senses!

HOW DO I CONVINCE YOU ABOUT THE RADON HEALTH RISK AND THAT YOU SHOULD TAKE ACTION?

READING THE SIGNS OF RISK: LOOK CLOSER!

Sometimes, it's the small details that count.

Before we talked about radon, let's talk about lung cancer

- Cancer is when cells' DNA/genes are damaged and cannot be repaired by the body.
- The damaged cells lose their growth control, and multiply.
- These cancer cells can create tumors and can spread and migrate to other areas of the body.

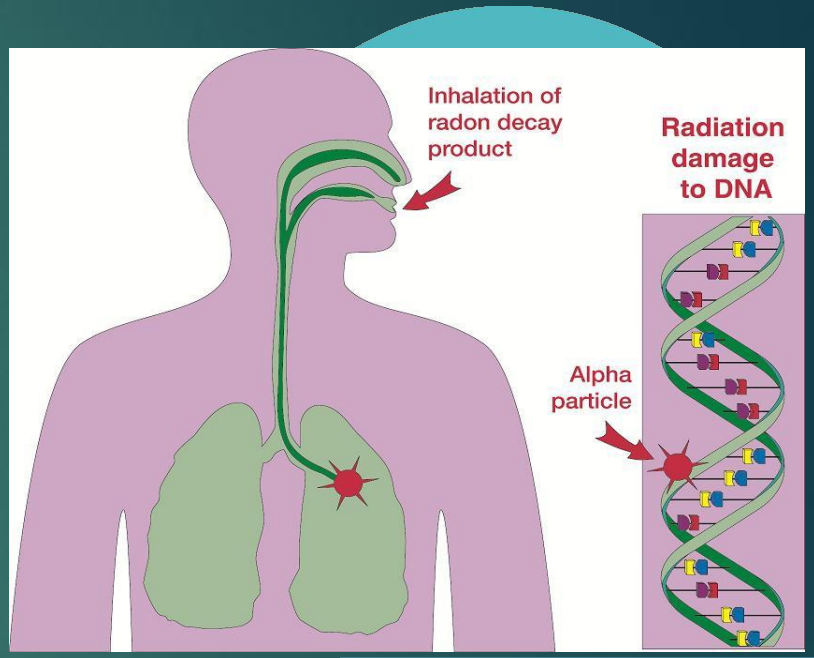
Lung cancer is the #1 cancer killer compared to other cancer types.

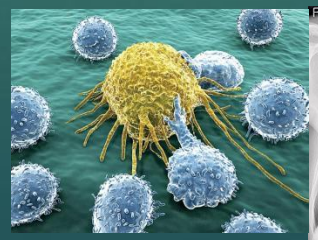
- Lung cancer usually is not diagnosed until later stages.
- The latter the stage diagnosis, the less survivability.

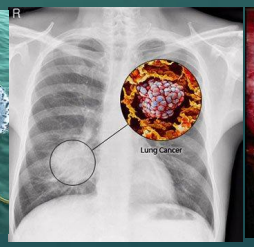
It was estimated for 2019, more than 228,000 people will be diagnosed with lung cancer.

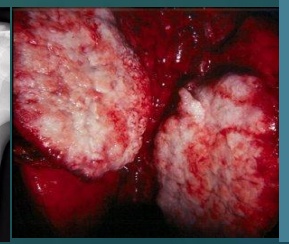
Smoking is the number one cause of lung cancer, RADON IS THE SECOND LEADING CAUSE OF LUNG CANCER

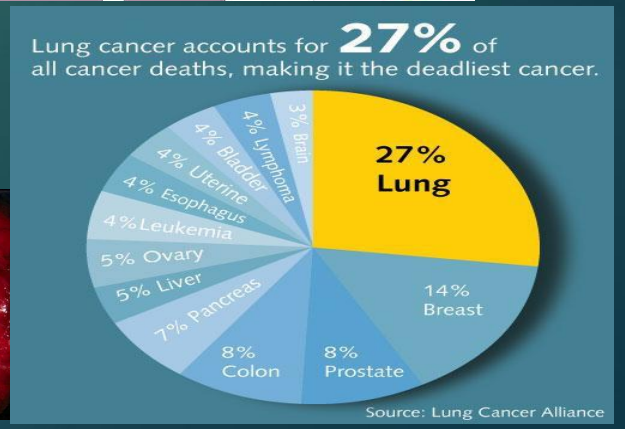
For never-smokers, radon-induced lung cancer is the Number #1 cause of lung cancer.









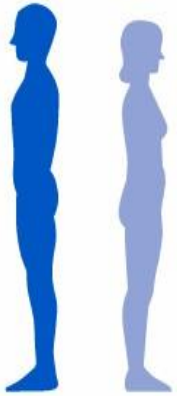


LUNG CANCER

Figure 3. Leading Sites of New Cancer Cases and Deaths – 2024 Estimates

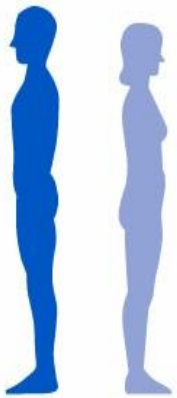
Estimated New Cases

Male			Female		
Prostate	299,010	29%	Breast	310,720	32%
Lung & bronchus	116,310	11%	Lung & bronchus	118,270	12%
Colon & rectum	81,540	8%	Colon & rectum	71,270	7%
Urinary bladder	63,070	6%	Uterine corpus	67,880	7%
Melanoma of the skin	59,170	6%	Melanoma of the skin	41,470	4%
Kidney & renal pelvis	52,380	5%	Non-Hodgkin lymphoma	36,030	4%
Non-Hodgkin lymphoma	44,590	4%	Pancreas	31,910	3%
Oral cavity & pharynx	41,510	4%	Thyroid	31,520	3%
Leukemia	36,450	4%	Kidney & renal pelvis	29,230	3%
Pancreas	34,530	3%	Leukemia	26,320	3%
All sites	**1,029,080**		**All sites**	**972,060**	



Estimated Deaths

Male			Female		
Lung & bronchus	65,790	20%	Lung & bronchus	59,280	21%
Prostate	35,250	11%	Breast	42,250	15%
Colon & rectum	28,700	9%	Pancreas	24,480	8%
Pancreas	27,270	8%	Colon & rectum	24,310	8%
Liver & intrahepatic bile duct	19,120	6%	Uterine corpus	13,250	5%
Leukemia	13,640	4%	Ovary	12,740	4%
Esophagus	12,880	4%	Liver & intrahepatic bile duct	10,720	4%
Urinary bladder	12,290	4%	Leukemia	10,030	3%
Non-Hodgkin lymphoma	11,780	4%	Non-Hodgkin lymphoma	8,360	3%
Brain & other nervous system	10,690	3%	Brain & other nervous system	8,070	3%
All sites	**322,800**		**All sites**	**288,920**	



Estimates are rounded to the nearest 10, and cases exclude basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder. Estimates do not include Puerto Rico or other US territories. Ranking is based on modeled projections and may differ from the most recent observed data.

An estimated 234,580 new cases of lung and bronchial cancer were diagnosed in 2024.

Around 125,070 people died from lung cancer in 2024.

81% of lung cancer deaths in 2024 were attributed to cigarette smoking.

Lung cancer accounts as the deadliest cancer – Source: American Lung Association

Radon is estimated to be responsible for approximately 21,000 lung cancer deaths annually, representing roughly 3% to 14% of all lung cancer cases.

Cancer Type	Estimated Deaths in 2023
Lung & bronchus cancer	131,584
Colorectal cancer	53,779
Female breast cancer *	41,760 (2021 estimate still cited)
Prostate cancer	33,881
Leukemia	23,710
Kidney & renal pelvis cancer	16,710
Bladder cancer	14,890
Radon-Related Lung Cancer	21,000

Sources: U.S. CDC United States Cancer Statistics (USCS) Data Visualizations Tool (2025).

U.S. Environmental Protection Agency (EPA) / CDC estimate on radon-related lung cancer deaths.

Sources: U.S. CDC United States Cancer Statistics (USCS) Data Visualizations Tool (2025).

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Sources: U.S. CDC United States Cancer Statistics (USCS) Data Visualizations Tool (2025).

American Lung Association.

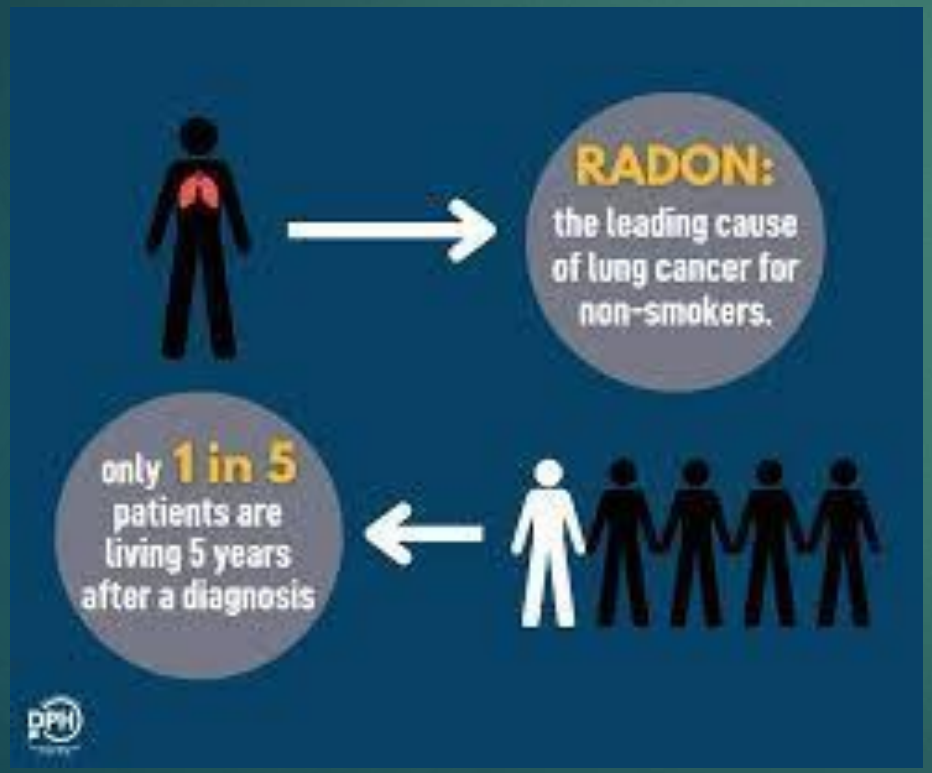
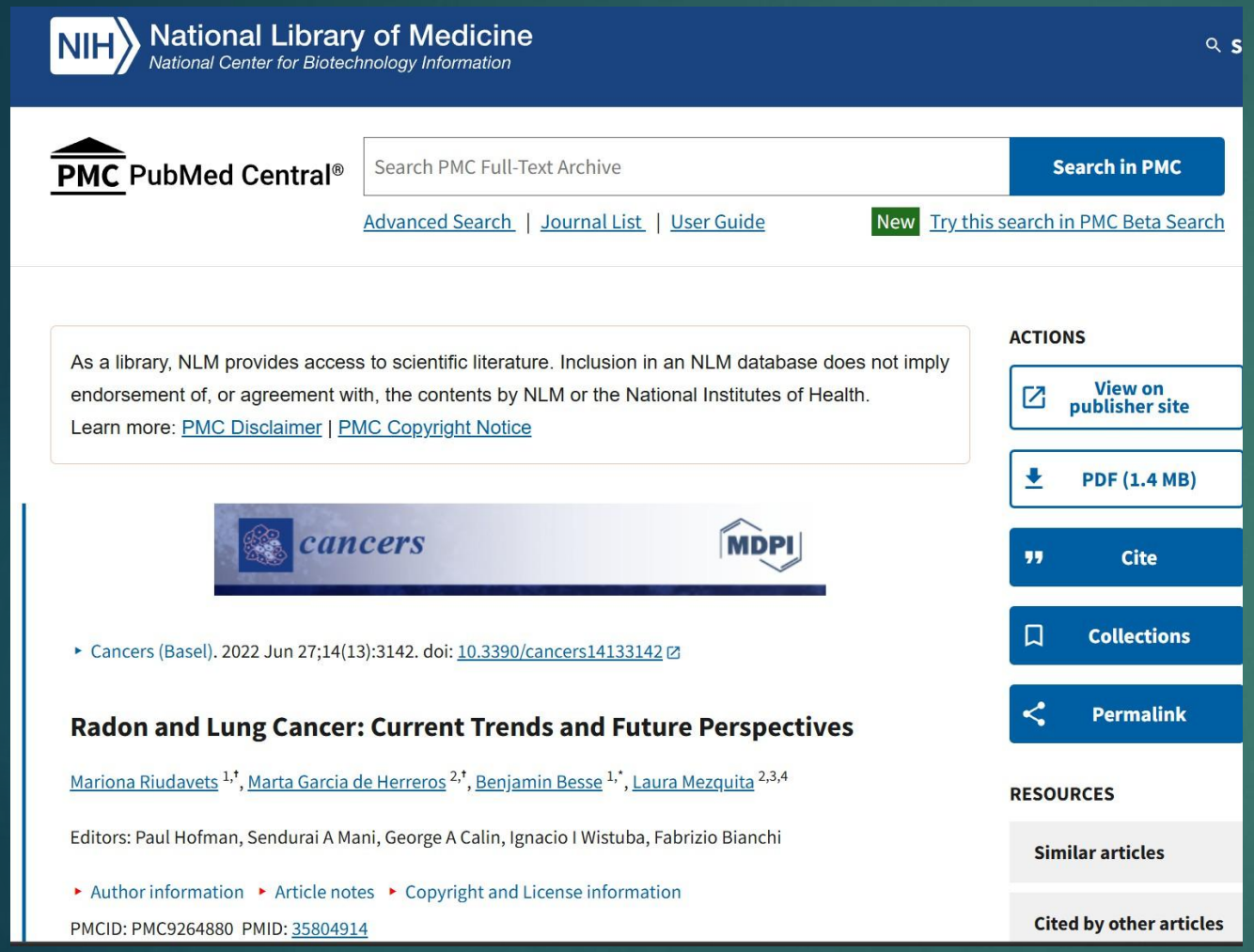


Table 1. Risk factors for the development of lung cancer in never-smokers

Radon
Indoor air pollution, eg. second-hand smoke
Occupational exposure, eg. paint, paint thinners
Burning biomass fuels
History of lung disease, eg. pulmonary tuberculosis
Ionising radiation
Family history

Studies on Radon and Lung Cancer: A Good Starting Reference Review



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cancers MDPI

Cancers (Basel). 2022 Jun 27;14(13):3142. doi: 10.3390/cancers14133142

Radon and Lung Cancer: Current Trends and Future Perspectives

Mariona Riudavets [1,†], Marta Garcia de Herreros [2,†], Benjamin Besse [1,*], Laura Mezquita [2,3,4]

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Molecular drivers in NSCLC are more often described in non-smoker patients and a potential association between radon exposure and oncogenic-driven NSCLC has been postulated.

Radon causes DNA damage and high genomic tumor instability, but its exact carcinogenesis mechanism and relationship with lung cancer remains unknown.

https://pmc.ncbi.nlm.nih.gov/articles/PMC9264880/

EPA Radon Risk

Lifetime Risk of Lung Cancer Death (Per Person) From Radon Exposure in Homes

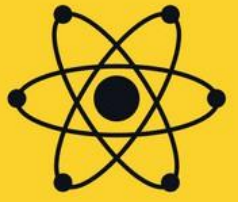
RADON LEVEL (pCi/L)	NEVER SMOKERS	CURRENT SMOKERS	GENERAL POPULATION
20	36 out of 1,000	26 out of 100	11 out of 100
10	18 out of 1,000	15 out of 100	56 out of 1,000
8	15 out of 1,000	12 out of 100	45 out of 1,000
4	73 out of 10,000	62 out of 1,000	23 out of 1,000
2	37 out of 10,000	32 out of 1,000	12 out of 1,000
1.25	23 out of 10,000	20 out of 1,000	73 out of 10,000
0.4	73 out of 100,000	64 out of 10,000	23 out of 10,000

Estimated Risks at the EPA Action Level (4 pCi/L)

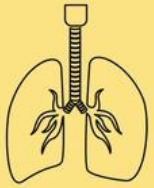
Never Smokers 7/1000 | Smokers 6/100

Radon is a cancer-causing gas

It comes from the radioactive decay of uranium and radium and exists naturally in rocks like granite. Colorado's large amount of granite translates to much higher levels of Radon than national averages.



Like carbon monoxide it is tasteless, colorless and odorless.



Radon breaks down into radioactive particles

Which are inhaled and become trapped inside the lungs. As these particles break down further they can damage the lung tissue and alter the DNA of the cells.

Radon is a leading cause of lung cancer

Only smoking causes more lung cancer deaths than exposure to Radon.

CARCINOGEN THAT CAUSES LUNG CANCER

Class A: Carcinogenic to Humans

RADON IS AN EPA "CLASS A" HUMAN

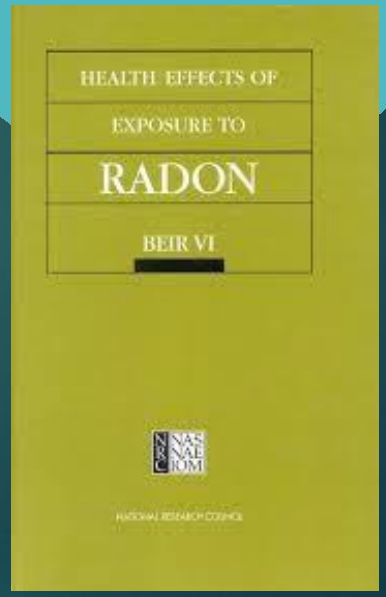
- Class B: Likely to be Carcinogenic to Humans
- Class C: Suggestive Evidence of Carcinogenic Potential
- Class D: Inadequate Information to Assess Carcinogenic Potential
- Class E: Not Likely to be Carcinogenic to Humans

Group A - Carcinogenic to Humans: **Agents with adequate human data to demonstrate the causal association of the agent with human cancer (typically epidemiologic data).**

THERE IS NO DOUBT THAT EXPOSURE TO RADIOACTIVE RADON GAS AND ITS RADIOACTIVE DECAY PRODUCTS CAN CAUSE LUNG CANCER!

The Weight of Evidence:

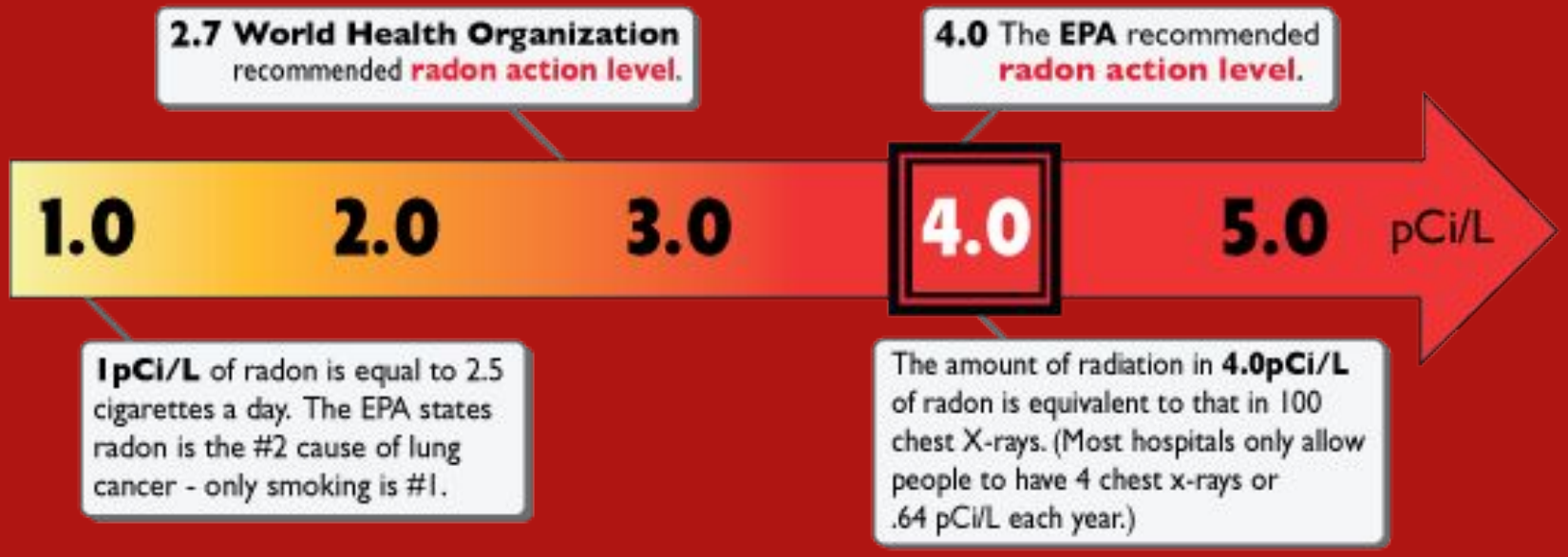
1. **Epidemiology**-human data—dose response assessment
2. **Results** of long-term experimental **animal bioassays**
3. **MECHANICS/SCIENCE**: Supporting data, including a variety of short-term tests for genotoxicity and other relevant properties, pharmacokinetic and metabolic studies, and structure-activity relationships



EPA RADON ACTION LEVEL:

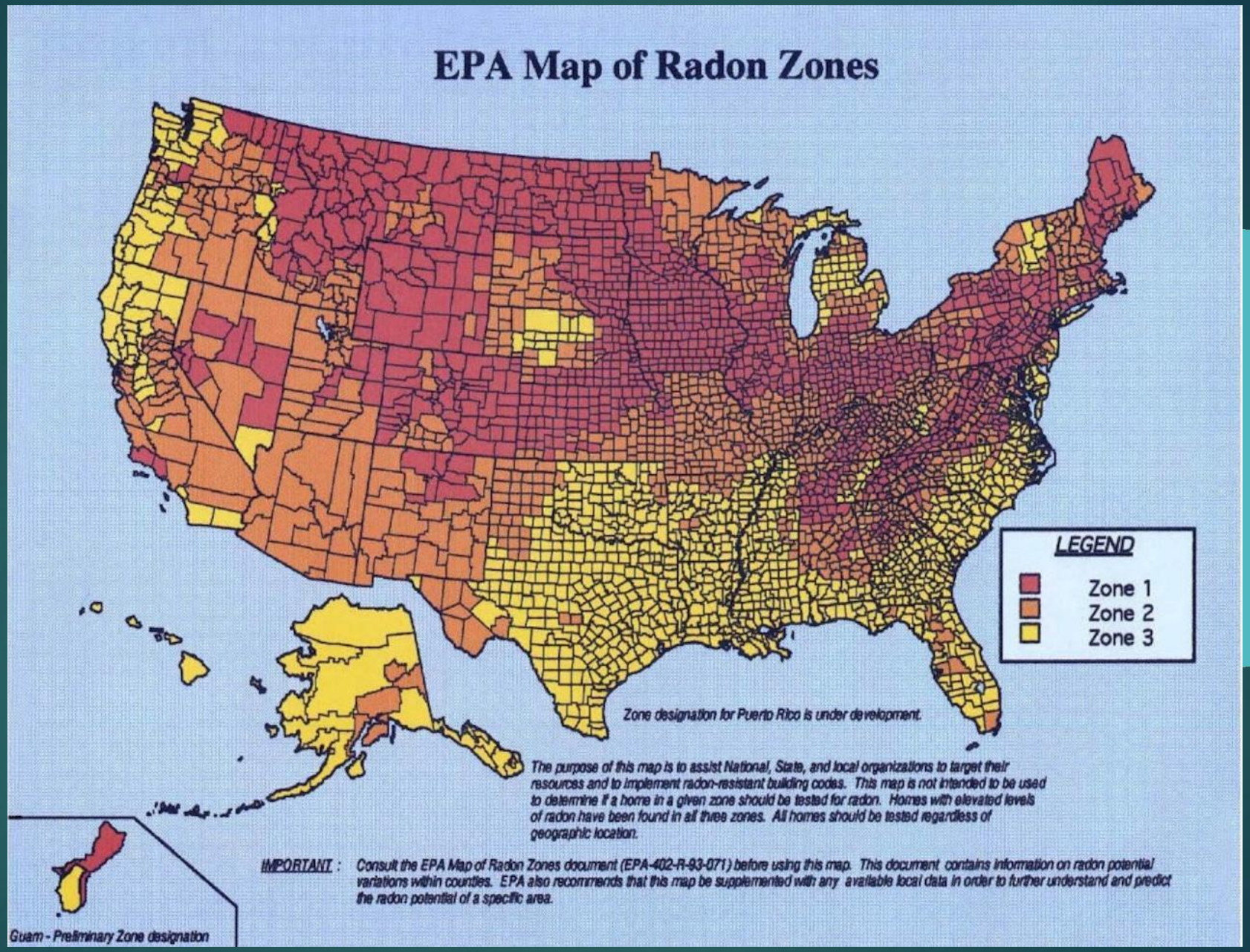
KEEP IN MIND THAT EVEN RADON LEVELS BELOW 4.0 PCI/L, STILL POSE A RISK. THE **GOAL IS TO MITIGATE THE RADON LEVELS AS LOW AS ACHIEVABLE.**

TESTING: The only way to know if you have a radon problem



The EPA says radon poses a greater health risk to children than to adults.

Information Provided By: National Radon Defense

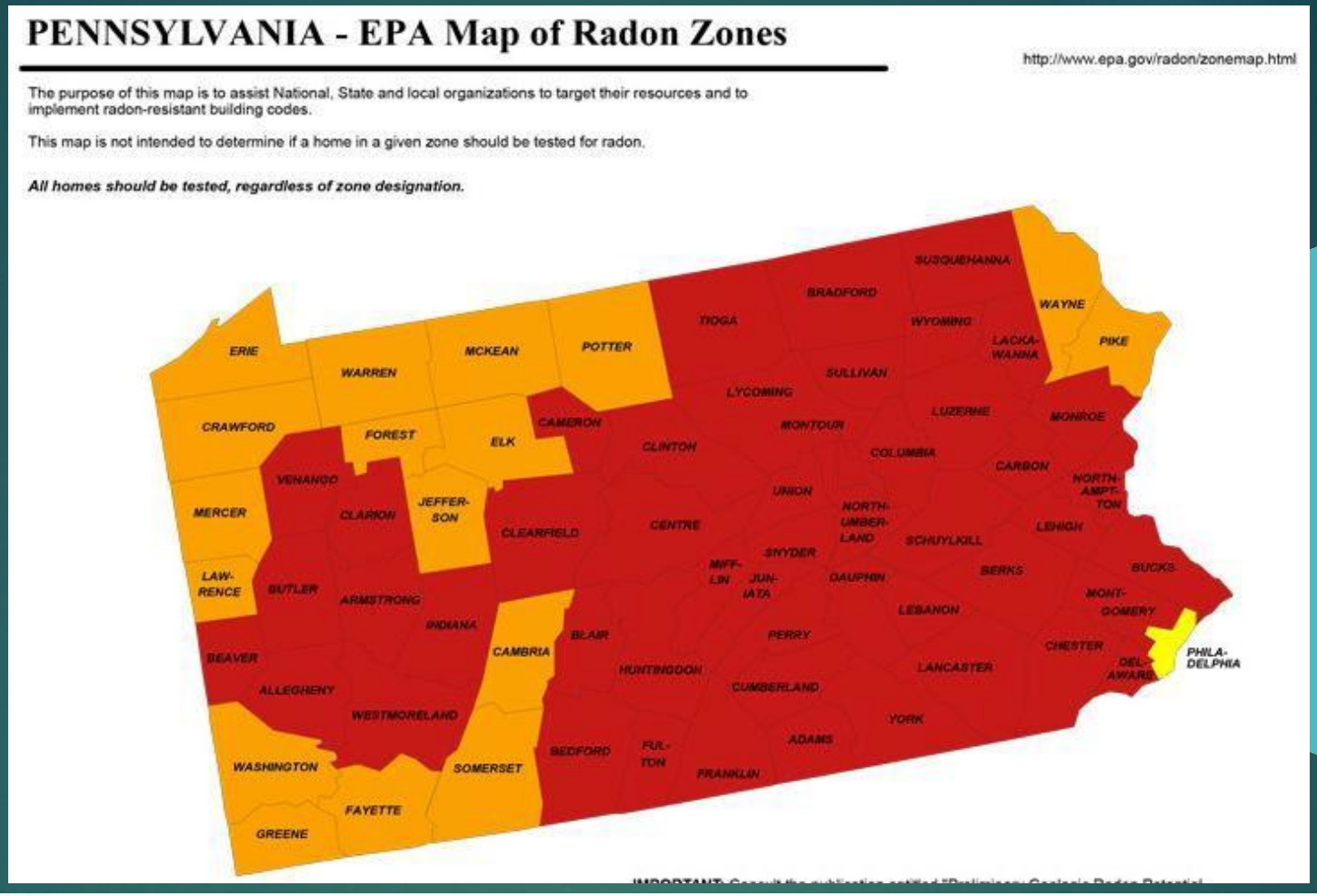


https://www.epa.gov/radon/epa-map-radon-zones

PLEASE NOTE, THERE IS NO SAFE RADON LEVEL! THE EPA 4 PCI/L IS NOT BASED FULLY ON HEALTH RISK!

PENNSYLVANIA HAS THE HIGHEST RADON LEVELS MEASURED IN THE OVER 17,000 PCI/L.

EPA ACTION LEVEL IS 4 PCI/L IN LEHIGH COUNTY



	Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCi/L (pico curies per liter) **(red zones)**	**Highest Potential**
	Zone 2 counties have a predicted average indoor radon screening level between 2 and 4 pCi/L **(orange zones)**	**Moderate Potential**
	Zone 3 counties have a predicted average indoor radon screening level less than 2 pCi/L **(yellow zones)**	**Low Potential**

WARNING: THE ONLY WAY TO KNOW IF YOU HAVE ELEVATED RADON IS TO TEST!!!!
ELEVATED RADON LEVELS HAVE BEEN FOUND IN THE YELLOW LOW POTENTIAL RADON ZONE ALSO.
The map zones are a potential guide only

Key Conclusions about Radon

Radon is responsible for about 21,000 lung cancer deaths every year.

-- U. S. Environmental Protection Agency

Each year, lung cancer caused by radon costs about $2 billion in medical care expenses and lost productivity.

-- Centers for Disease Control and Prevention

Indoor Environments Association / AARST, 2025

PENNSYLVANIA

The Radon Report Card: Risk and Response

Population and Lung Cancer

Total Population: 12,800,922

Lung Cancer Deaths: 6,778

Age-Adjusted Lung Cancer Incidence Rate (per 100,000) 60

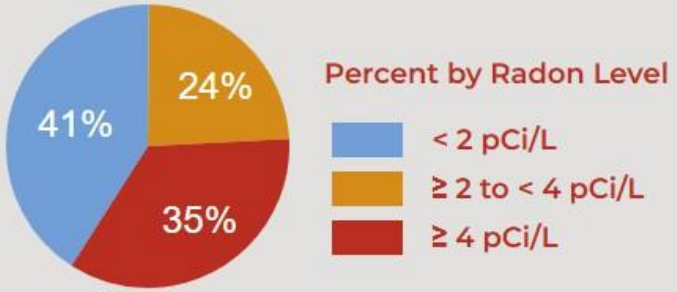
Lung Cancer Cases	10,805
Radon-Induced Lung Cancer Cases	3,018
* Medical Costs (hospital, medicine, doctors)	$607,000,000
* Economic Costs (lost wages / productivity)	$637,000,000

Statewide Radon Policies

Credential Required	✓	State Certification
Radon Standards in Effect	✓	PA Testing and Mitigation; EPA Schools; ANSI-AARST Multifamily
Homebuyer Protection Required	✓	Disclosure Only
Radon System Requirement for New Homes	✗	No
Type of New Home Where Required		N/A
Standard/Code for Radon System in New Homes		N/A
School Testing Required	✗	No
Radon System Requirement for New Schools	✗	No

Buildings and Exposure Potential

Pre-Mitigation Radon Tests: 940,627



Housing Units by Structure Type

	1 to 4 Units	5 or More Units	Total
Existing	5,004,266	687,557	5,691,823
New	16,442	7,097	23,539

Public Schools: 2,947

EPA and ANSI-AARST Radon Measurement Standards recommend fixing a building with a radon level ≥ (above or equal to) 4 pCi/L and consider fixing it if any radon level is ≥ 2 and < (below) 4 pCi/L.

https://aarst.org/report-card/

Indoor Environments Association / AARST, 2025

DELAWARE

The Radon Report Card: Risk and Response

Population and Lung Cancer

Total Population: 965,479

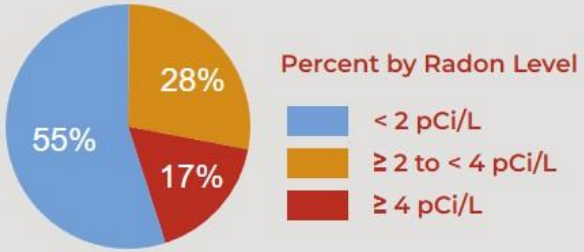
Lung Cancer Deaths: 529

Age-Adjusted Lung Cancer Incidence Rate (per 100,000) 58

Lung Cancer Cases	802
Radon-Induced Lung Cancer Cases	71
* Medical Costs (hospital, medicine, doctors)	$14,000,000
* Economic Costs (lost wages / productivity)	$15,000,000

Buildings and Exposure Potential

Pre-Mitigation Radon Tests: 12,214



Housing Units by Structure Type

	1 to 4 Units	5 or More Units	Total
Existing	373,376	59,542	432,918
New	5,824	715	6,539

Public Schools: 225

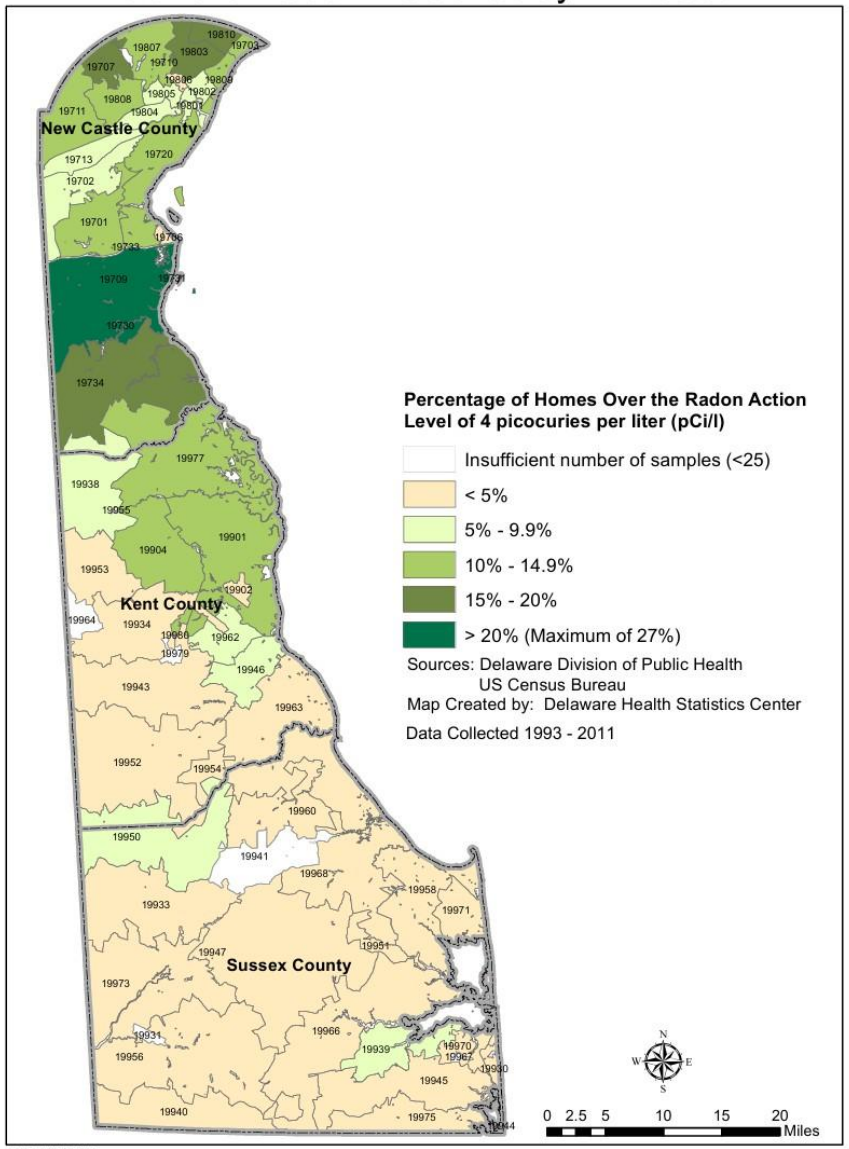
Statewide Radon Policies

Credential Required	✗	None
Radon Standards in Effect	✗	None
Homebuyer Protection Required	✓	Notification & Disclosure
Radon System Requirement for New Homes	✗	No
Type of New Home Where Required		N/A
Standard/Code for Radon System in New Homes		N/A
School Testing Required	✗	No
Radon System Requirement for New Schools	✗	No

EPA and ANSI-AARST Radon Measurement Standards recommend fixing a building with a radon level ≥ (above or equal to) 4 pCi/L and consider fixing it if any radon level is ≥ 2 and < (below) 4 pCi/L.

Total Population; Lung Cancer Deaths; Age-Adjusted Lung Cancer Rate (per 100,000); Lung Cancer Deaths: CDC US Cancer Statistics (2018). Estimated Radon-Induced Lung Cancer Cases: Lung Cancer Cases weighted by scaled mean radon levels, CDC Environmental Public Health Tracking Network (2008-2017). National Cancer Institute, Cancer Trends Progress Report (2022) and Productivity Costs of Cancer Mortality in the US (2008). Statewide Radon Policies: IEA staff compilation, 2025. Pre-Mitigation Radon Tests from Labs: CDC Environmental Public Health Tracking Network (2008-2017). Existing Housing Units and New Housing Units: US Census (2019). Public Schools: National Center for Educational Statistics (2020-2021).

Delaware Radon Incidence by ZIP Code



https://aarst.org/report-card/

https://dhss.delaware.gov/wp-content/uploads/sites/10/dph/pdf/hhinsideradonzip. pdf

RADON LEVELS IN VARIOUS PA LOCATIONS

Penn Hills, PA

pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION

Radon Test Data by Zip Code

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
15235	BASEMENT	5185	101.7	4.8
15235	FIRST FLOOR	270	53.4	3.6

Doylestown, PA

pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION

Radon Test Data by Zip Code

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
15090	BASEMENT	11576	240.9	8.6
15090	FIRST FLOOR	943	66.5	5.8

Emmaus, PA

pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION

Radon Test Data by Zip Code

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
18049	BASEMENT	4108	1440.4	8.3
18049	FIRST FLOOR	519	81.2	4.6

Wexford, PA

pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION

Radon Test Data by Zip Code

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
18901	BASEMENT	16156	427.8	5.4
18901	FIRST FLOOR	3930	155.8	3.4

http://cedatareporting.pa.gov/Reportserver/Pages/R eportViewer.aspx?/Public/DEP/RP/SSRS/RadonZip

Radon by the Numbers

21,000
lung cancer deaths per year

#1
environmental cause of **any cancer**

#1
cause of lung cancer among people who have **never smoked**

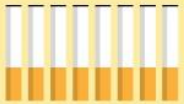
10x risk of lung cancer among **people who smoke** compared with people who never smoked with same radon exposure

1 in 15
homes in the US have **high radon levels**

If radon levels are **≥ 4.0 pCi/L**, EPA recommends installing a **radon reduction system.**

This equals...

200 chest x-rays per year **or** **8** cigarettes per day



pCi/L is shorthand for picocuries per liter, the units of measurement of the amount of radon in an air sample.

2 steps
to protect yourself from radon-associated lung cancer:

Test your home's **radon levels.**

Fix your home if radon levels are **≥ 4pCi/L.**

www.cdc.gov/radon

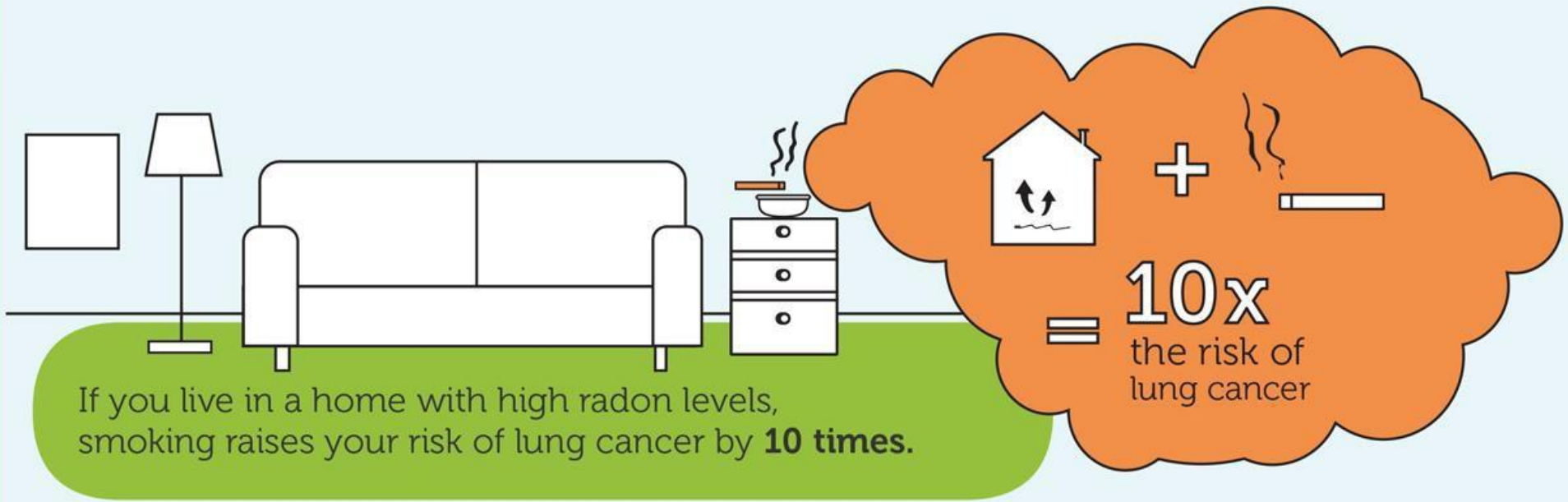
Data sources: Environmental Protection Agency (EPA) and the American Association of Radon Scientists & Technologists

Radon exposure is preventable. We can act to reduce lung cancer risk for all **Built Environments** (both facilities and home-based)

Did you know?

- **11-15% of 230,000 lung cancer cases are attributable to radon**
- **EPA estimates that 21,000 radon induced lung cancer deaths occur annually**
- Radon is carcinogenic, and long-term exposure to radon can cause lung cancer
- **PA (Lehigh County) has the highest recorded radon level in the US (greater than 17,000 pCi/L)**
- About 40% of PA homes have elevated radon levels (above 4 pCi/L)

Radon and Smoking: A Dangerous Combination



Learn more by calling the National Radon Hotline:

1-800-SOS-RADON (1-800-767-7236)

Source: U.S. Environmental Protection Agency

Research Journal of Environmental Toxicology

Year: 2012 | Volume: 6 | Issue: 2 | Page No.: 51-58

DOI: 10.3923/rjet.2012.51.58

RESEARCH ARTICLE

Radon-induced Chromosome Damage in Blood Lymphocytes of Smokers

C. Meenakshi

Indira Gandhi Centre for Atomic Research, Radiological Safety Division, Kalpakkam-603102, Tamil Nadu, India

Mary N. Mohankumar

Indira Gandhi Centre for Atomic Research, Radiological Safety Division, Kalpakkam-603102, Tamil Nadu, India

- Radon-induced Chromosome Damage in Blood Lymphocytes of Smokers
- https://scialert.net/fulltext/?doi=rjet.2012.51.58
- CONCLUSION: The present study reveals significantly higher frequency of chromosome aberrations in smoker cells exposed in vitro to radon compared to non-smokers. Thus the synergistic effect of smoking and radon is well established.

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Int J Environ Res Public Health. 2020 Apr 24;17(8):2946. doi: 10.3390/ijerph17082946.

Residential Radon Exposure and Cigarette Smoking in Association with Lung Cancer: A Matched Case-Control Study in Korea

Eung Joo Park [1 2], Hokyou Lee [3 4], Hyeon Chang Kim [3 5], Seung Soo Sheen [6], Sang Baek Koh [7], Ki Soo Park [8], Nam Han Cho [9], Cheol-Min Lee [10], Dae Ryong Kang [1 2]

Affiliations + expand

PMID: 32344675 PMCID: PMC7215527 DOI: 10.3390/ijerph17082946

Abstract

Residential radon exposure and cigarette smoking are the two most important risk factors for lung cancer. The combined effects thereof were evaluated in a multi-center matched case-control study in South Korea. A total of 1038 participants were included, comprising 519 non-small cell lung cancer cases and 519 age- and sex- matched community-based controls. Residential radon levels were

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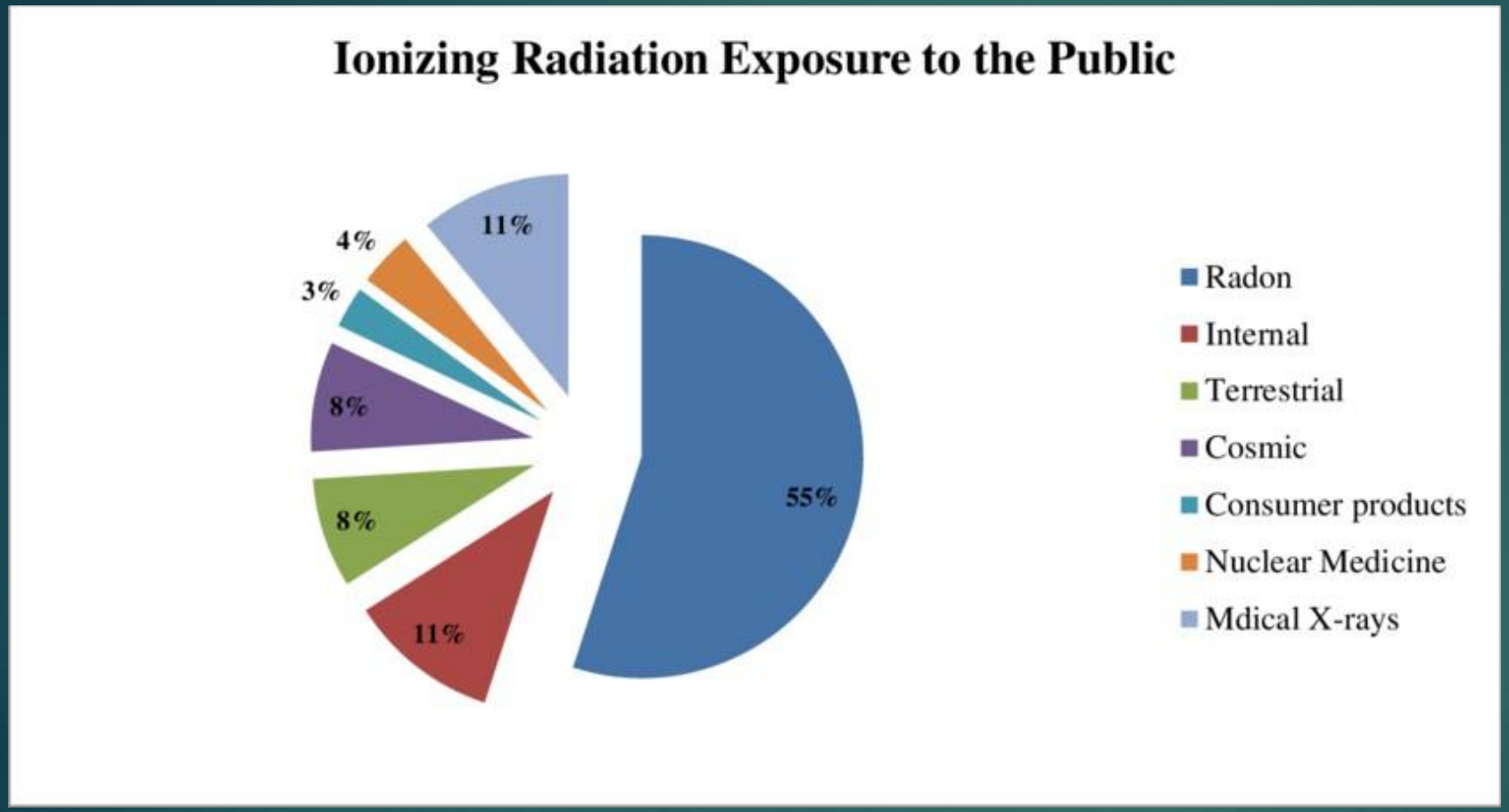
Conclusion: In conclusion we found both residential radon and cigarette smoking to be associated with increased odds for lung cancer, and the difference in ORs (odds ratios) according to radon exposure was much greater in smokers than in non-smokers.

Therefore, preventative strategies targeting radon-related lung cancer should emphasize, in addition to radon-reducing repairs and ventilation, both smoking cessation and withdrawing from second-hand smoking.

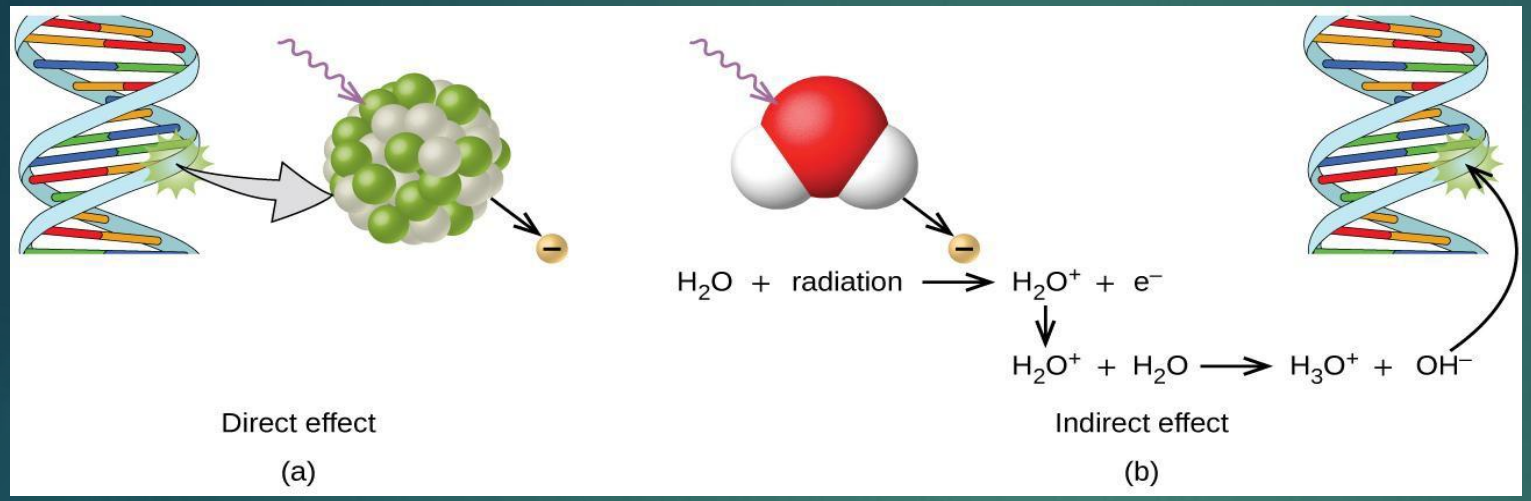
Recommendation: Consider combining radon and smoking cessation messaging together for the public.

Radon poses the greatest ionizing radiation exposure to the public built environments (homes, schools, childcare buildings, workplaces, etc.)



Exposure to radon and its decay products is cumulative across all built environments (homes, schools, workplaces)

THE FORENSICS OF RADON DECAY PRODUCTS ALPHA RADIATION DAMAGE TO LUNG CELLS: THE BULLETS OF RADIATION TO THE LUNG CELLS!



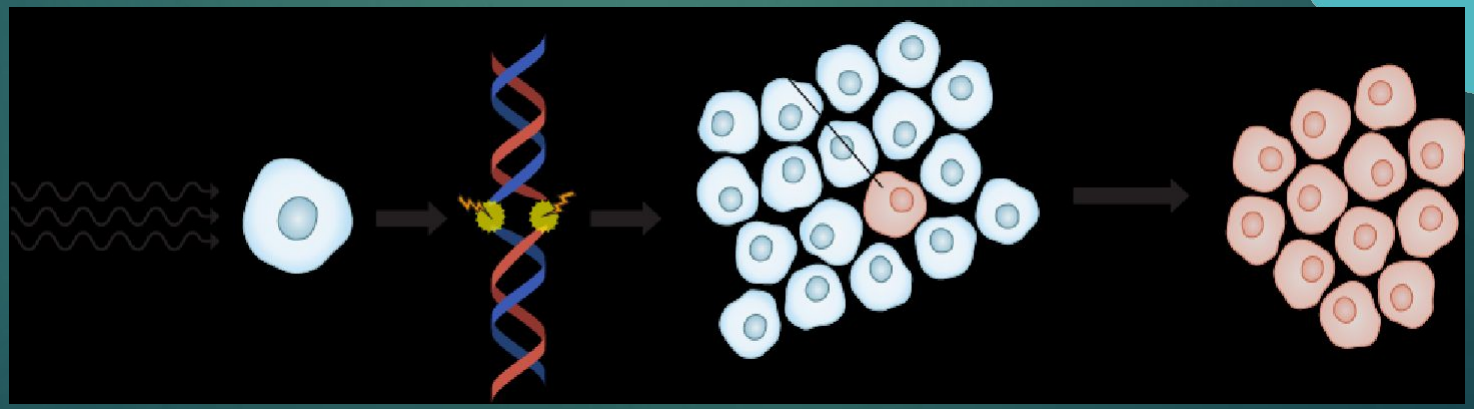
IT IS POSSIBLE EVEN ONE ALPHA PARTICLE IMPACT COULD CAUSE A LUNG CELL TO GO CANCEROUS.

THE HIGHER THE RADON LEVEL, THE HIGHER THE RISK

THE LONGER THE EXPOSURE THE HIGHER THE RISK

IF YOU SMOKE, THE RISK OF LUNG CANCER IS HIGHER

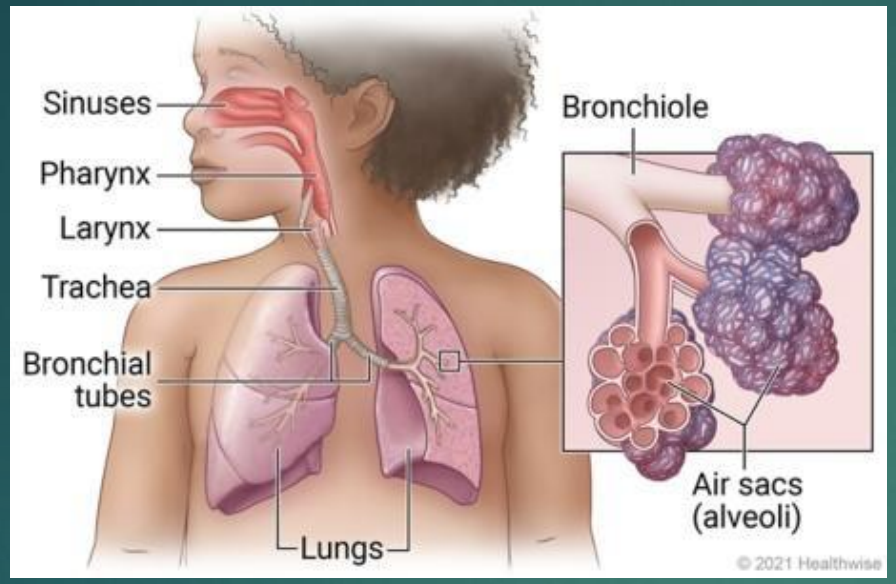
Keep in mind that cells can repair some damage, but not all.
Other factors, genetic predisposition, other carcinogenic exposures and long-term and cumulative damage.



GENETIC DISPOSITION ALSO PLAYS A PART.

LATENCY PERIOD IS AROUND 5-25 YEARS RADON EXPOSURE

THE KEY POINT FOR RADON TOXICITY FOR CHILDREN



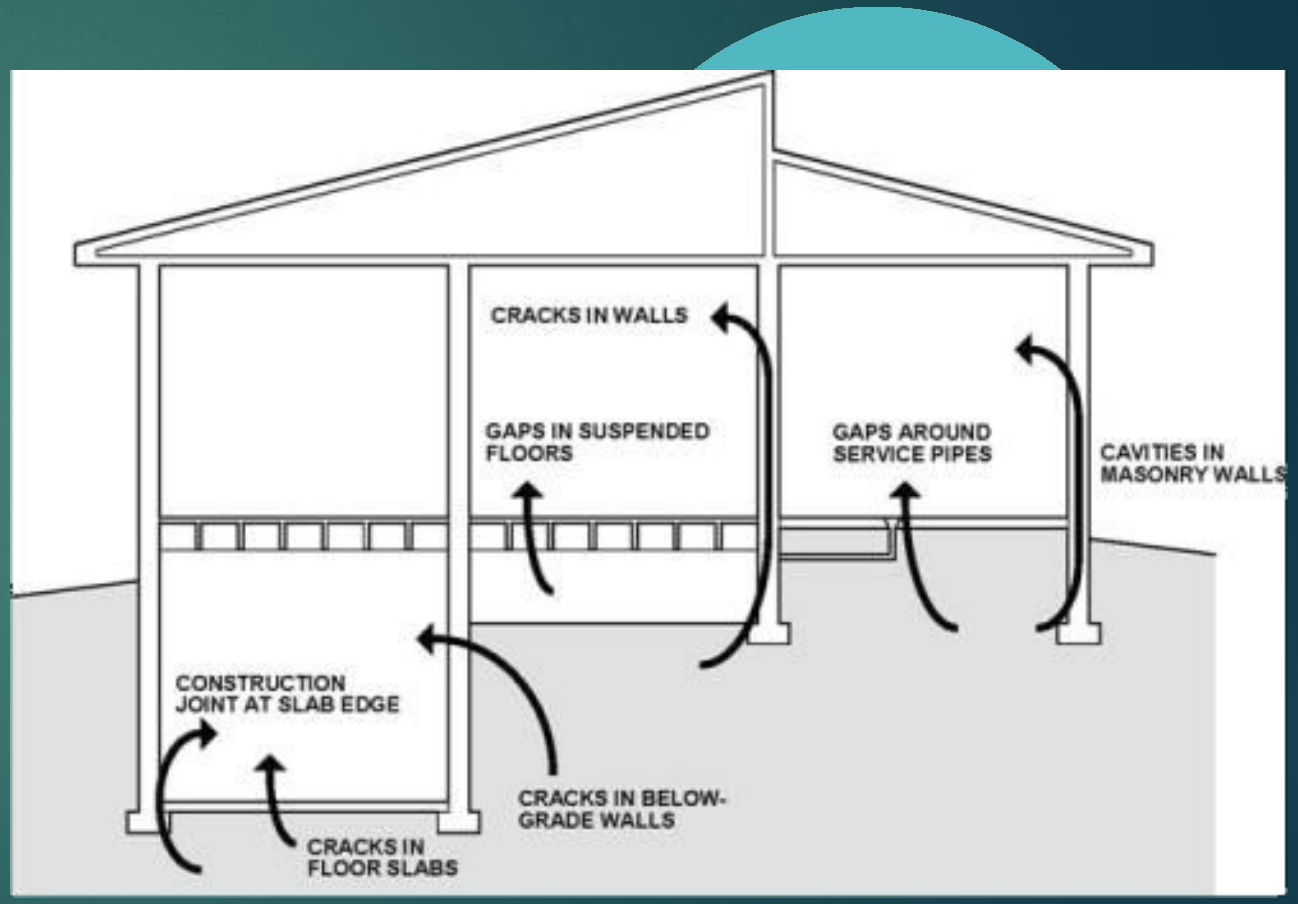
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

How Can Radon Affect the Health of Children

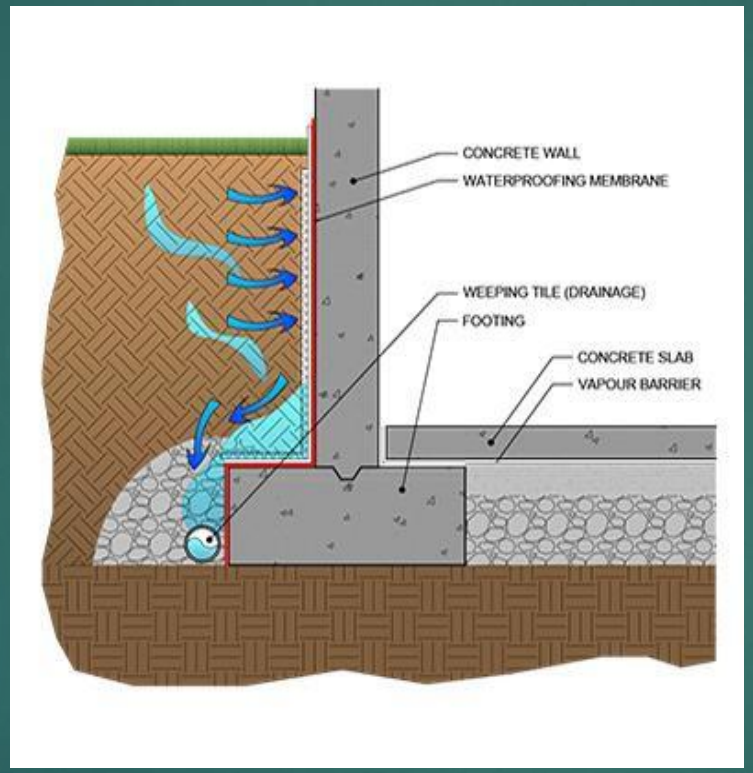
A child's different lung shape, size, and breathing rates as compared with adults means higher estimated radiation doses.

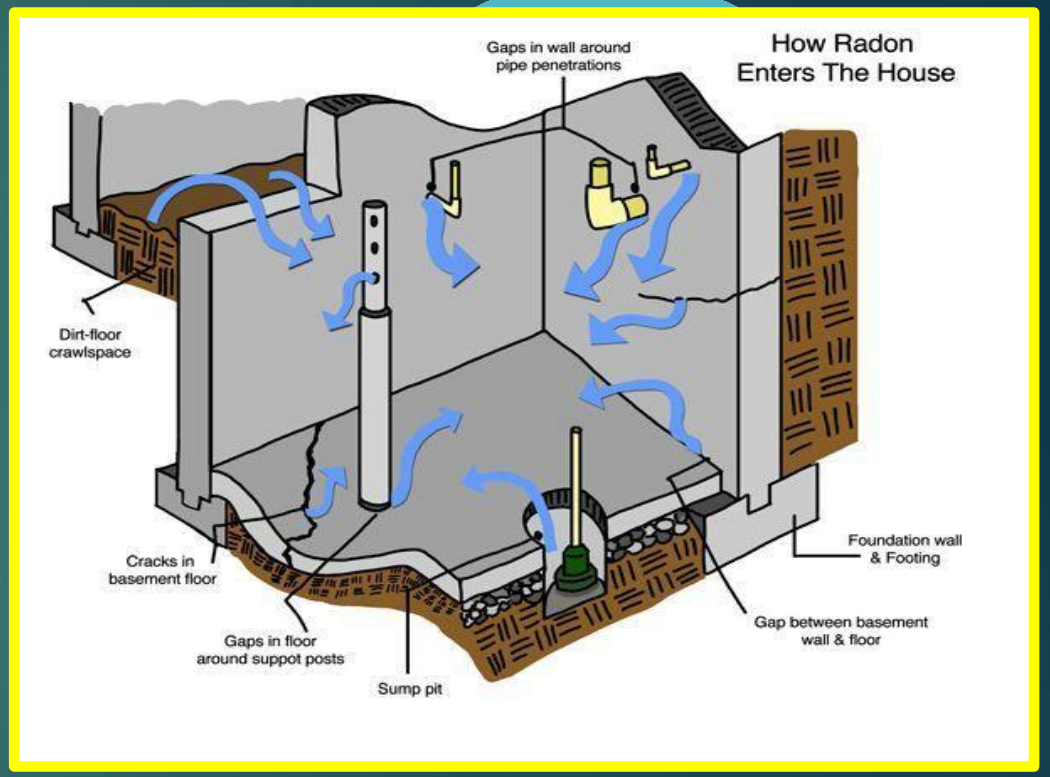
- Risk of lung cancer in children resulting from exposure to radon may be almost twice as high as the risk to adults exposed to the same amount of radon.
- If children are also exposed to tobacco smoke, the risk of lung cancer is at least 20 times greater.

Radon Entry Into the Built Environment

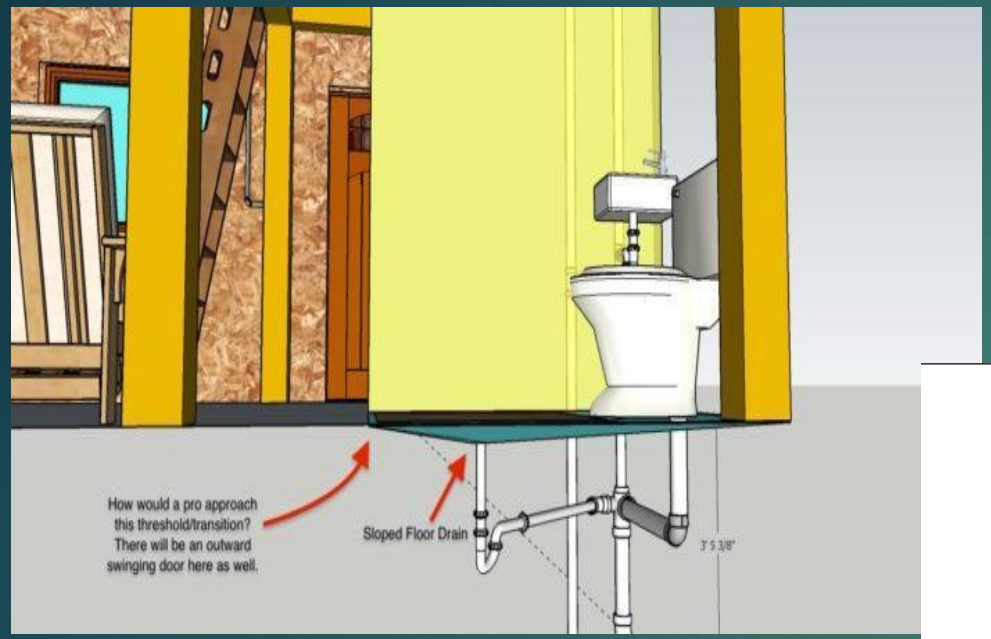


Basements or below grade spaces can be a major source of radon entry

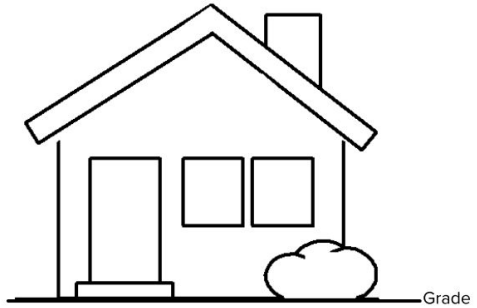




Even slab on grade buildings can have elevated radon levels!

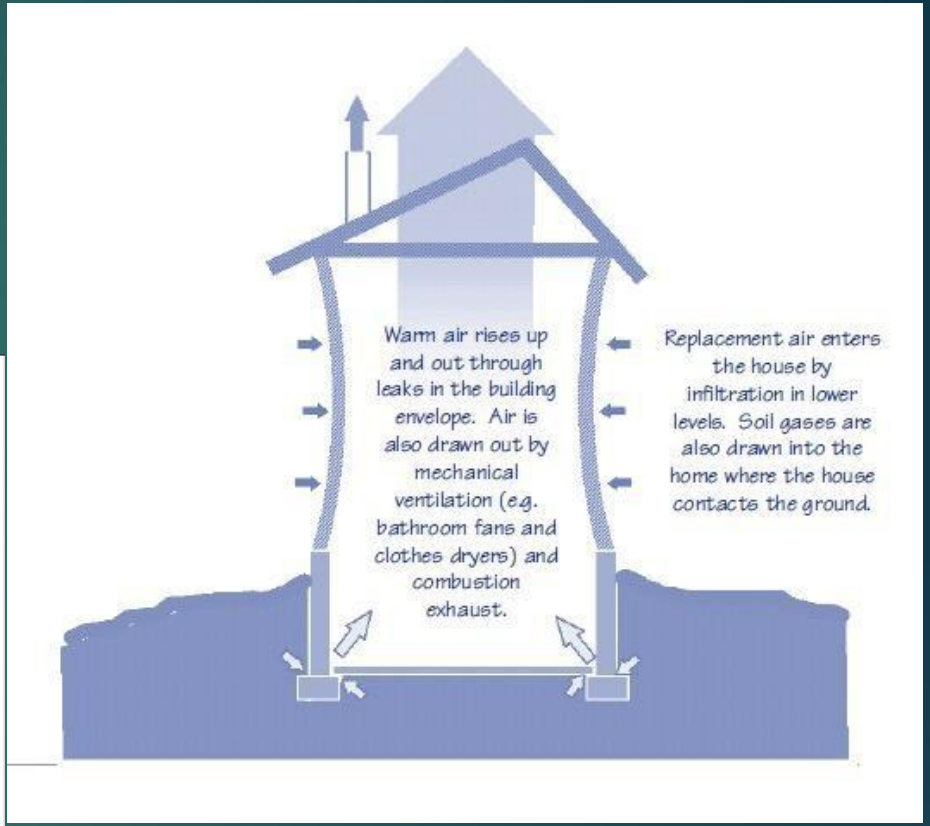


Slab-on-Grade
(non-elevated)



A building whose foundation is slab-on-grade or slab-on-stem-wall with fill. The bottom floor is at or above ground level (grade) on at least one side. If slab-on-grade, there is no airspace between the ground & the lowest floor of the building. Note: An elevated building that has a crawlspace foundation w/an attached slab-on-grade finished room or slab-on-grade garage converted to a living area would be slab-on-grade.

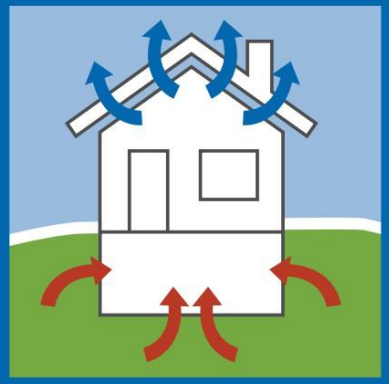
Includes EC Diagrams 1a, 1b & 3



RADON ENTRY BASICS

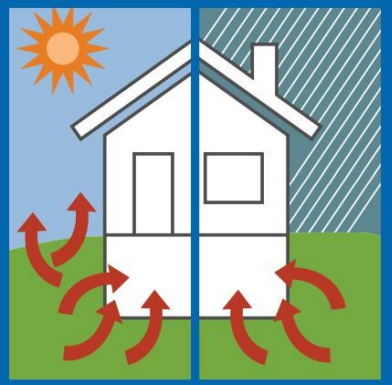
Radon varies constantly

Environmental effects: frost or other factors that "cap" soil



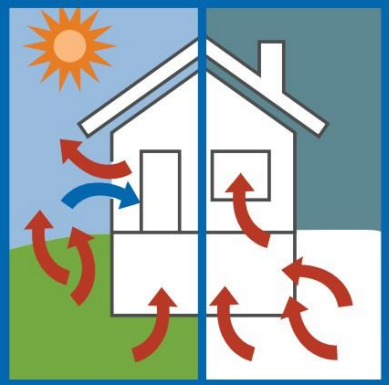
- Frost can "cap" the soil so negative pressure of buildings is exerted on larger area.
- Asphalt aprons around large buildings can have the same effect.

Rain effects



- Can "cap" the soil.
- Can displace and force soil gas into building.
- Often accompanied with barometric pressure changes.

Effects of open windows

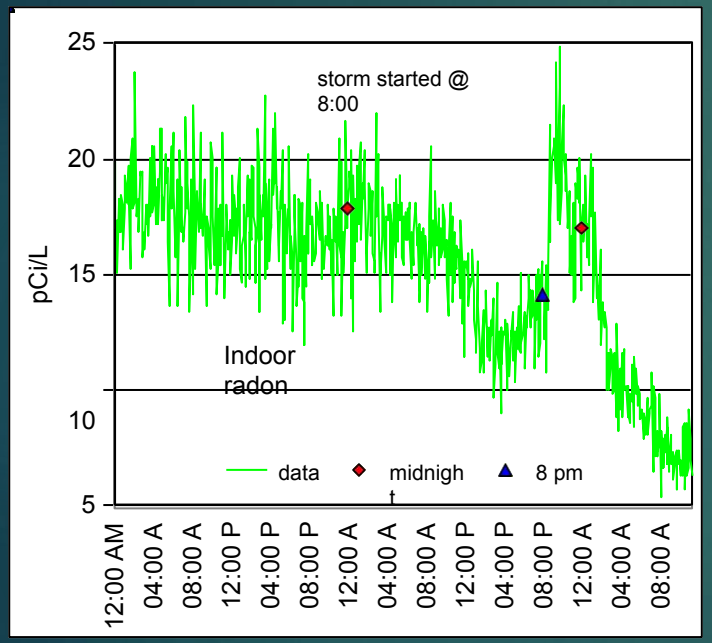


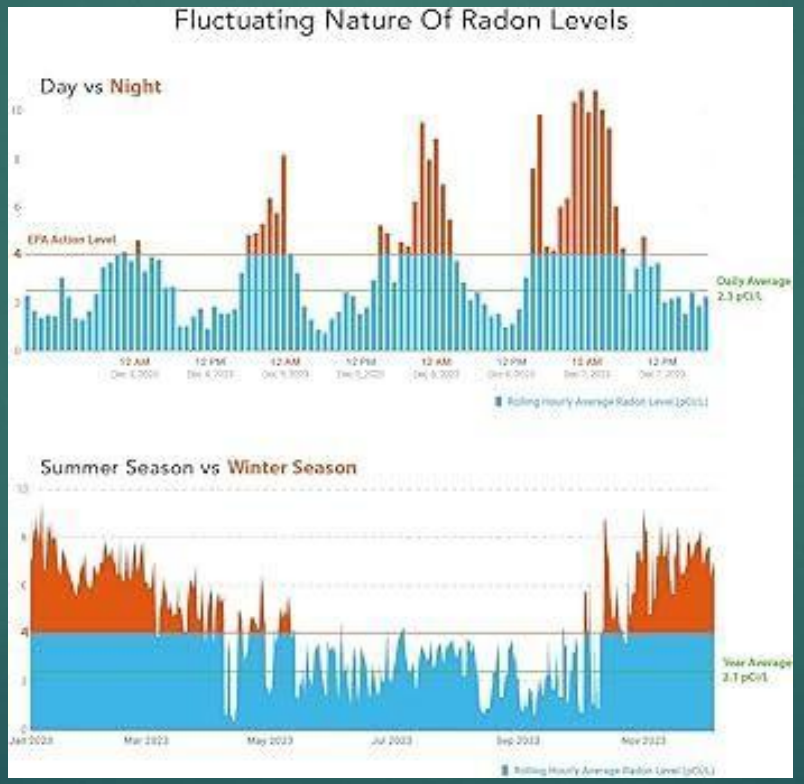
- Reduces vacuum and thereby reduces radon entry into building.
- Increases natural ventilation and radon dilution.
- Open windows do not reflect radon potential.

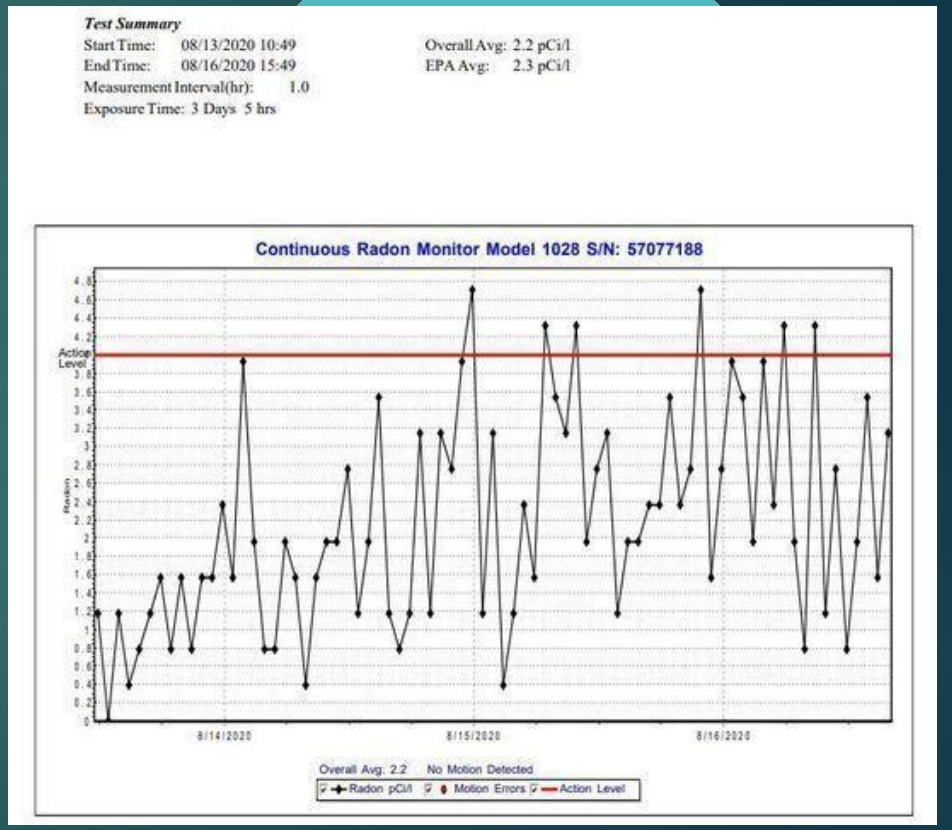
Rate of Radon Entry Varies

Radon concentrations can change rapidly in home

- Temperature and seasonal changes
- Weather changes
- Use of ventilation features in home

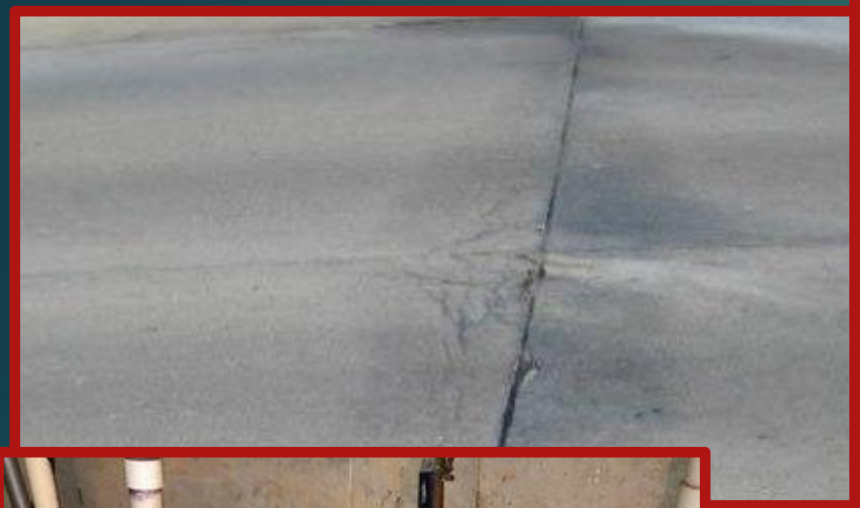


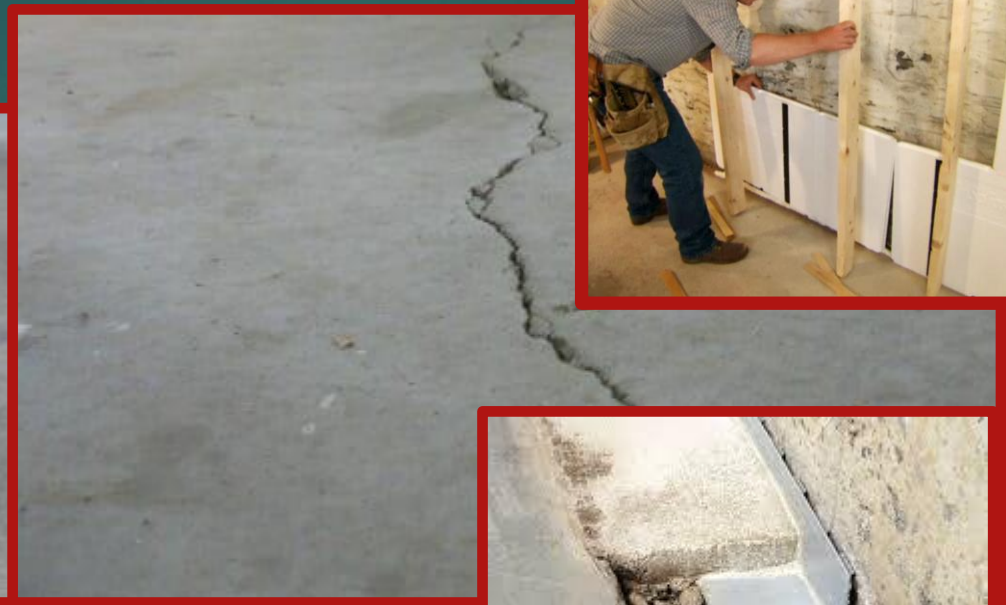




THE MAIN FOCUS ON RADON TEST LEVELS IS THE AVERAGE EXPOSURE RESULTS FOR A SPECIFIED TIME DURATION.

Radon Entry Into School Buildings/Houses



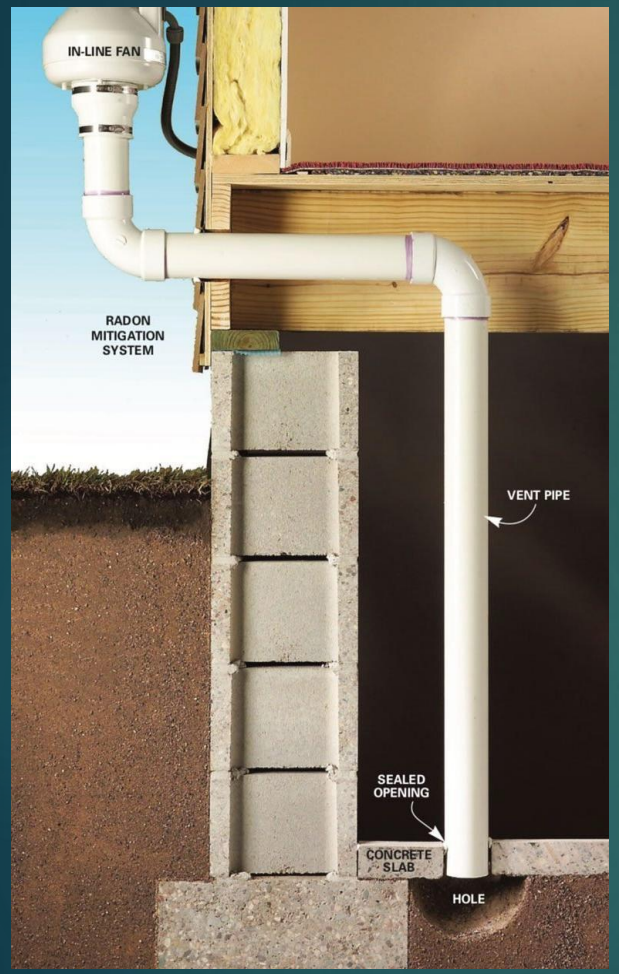


Radon Test Kits

THE ONLY WAY TO KNOW IS TO TEST

- ✔ Easy to use to determine if your home has elevated radon levels
- ✔ Cost in range of $20 per test kit, that includes laboratory analysis
- ✔ Can be purchase at hardware stores, online or directly from radon test manufacturers
- ✔ CANCER BRIDGES WILL HAVE 65 FREE RADON TEST KITS AVAILABLE FOR THIS PROGRAM
- ✔ Tests duration of 3-5 days. Recommend placing detectors in lowest livable room
- ✔ If radon levels are low and the house undergoes changes, test every 5 years. KEEP RECORDS

RADON MITIGATION SYSTEM FOR LOWERING THE RISK



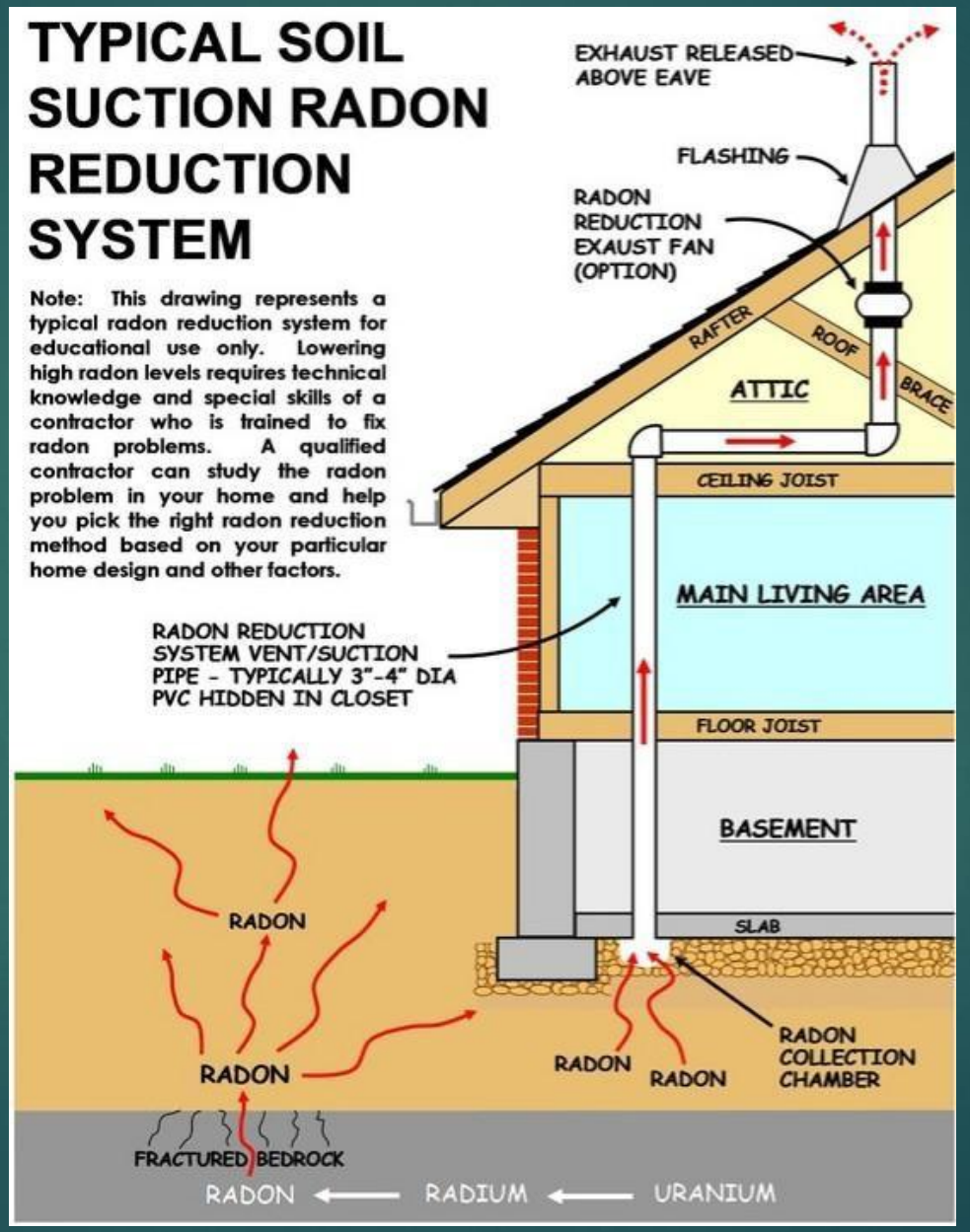
Installed by a PA-certified mitigator

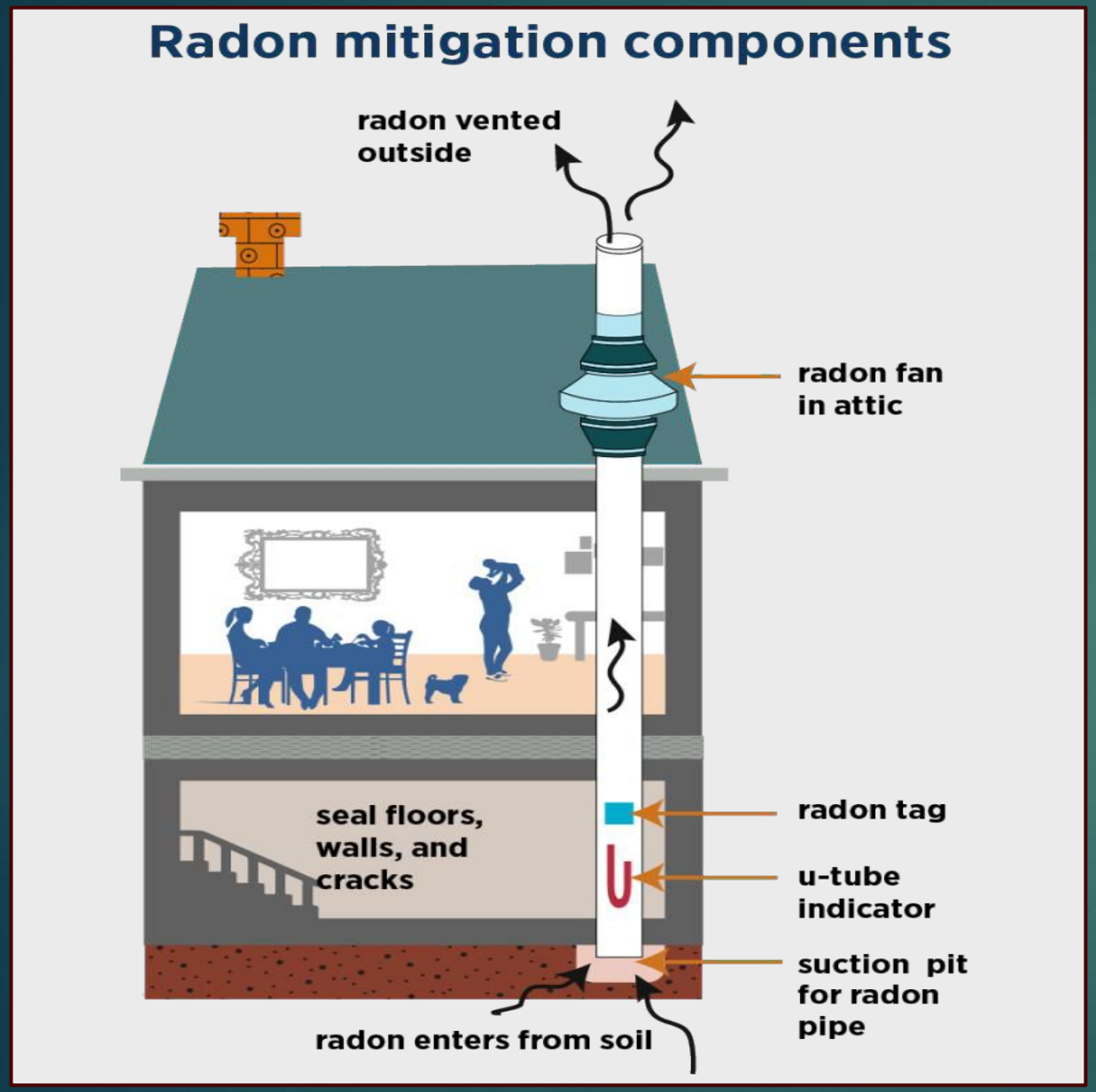
Cost Range: $1100-$1500+

Check on the PA DEP website to see certified mitigators in your area - PA DEP RADON SERVICES DIRECTORY

https://www.dep.pa.gov/Business/RadiationProtection/RadonDivision/Certification/Pages/ServicesDirectory.aspx

How A Radon Mitigation System Works



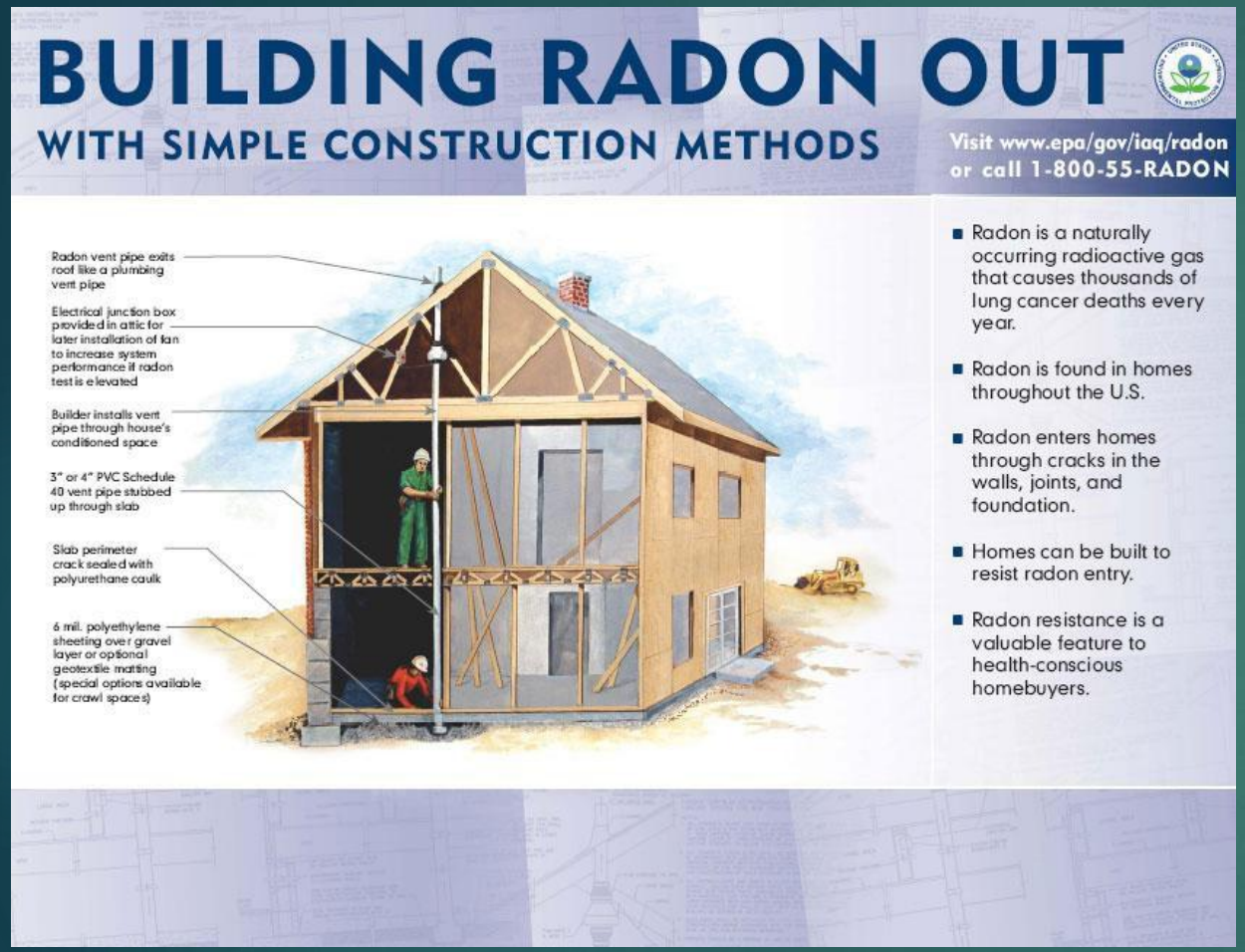


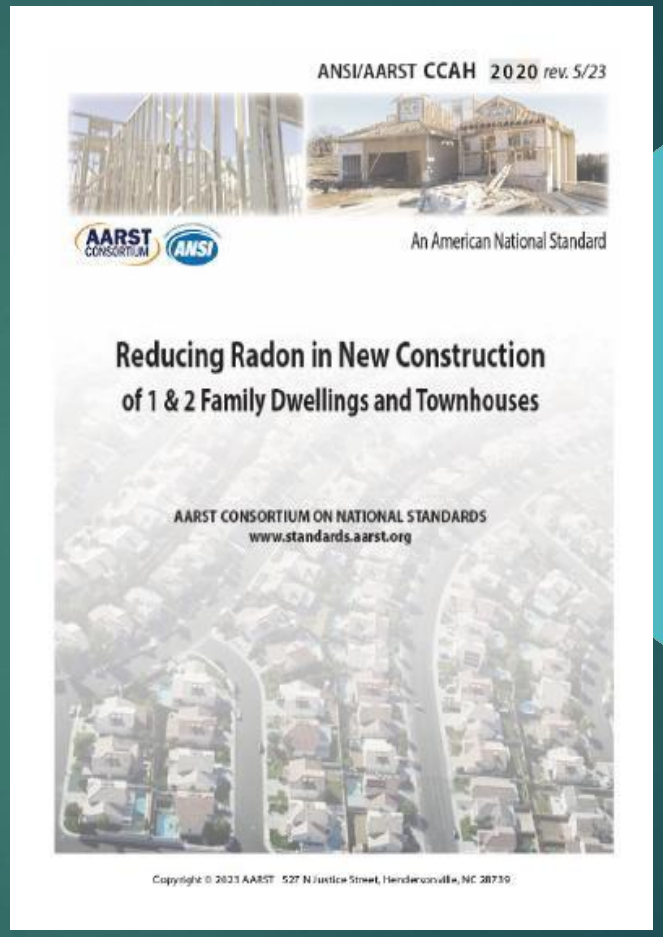
Radon active soil depressurization mitigation system:

- Installed by a state-certified radon mitigator.
- Removes the radon gas under the slab foundation floor before it can enter in the living space.
- **The radon mitigation system can also remove below-slab soil moisture, reducing the contribution to relative humidity/dampness from soil, similar to a sub-slab dehumidifier. BENEFIT!**
- The installed mitigation system is quiet and can last for many years.
- **The house with a radon mitigation system should retest for radon every 2 years.**

Exterior appearance of basic house radon mitigation systems

Radon resistant design should be in new construction buildings

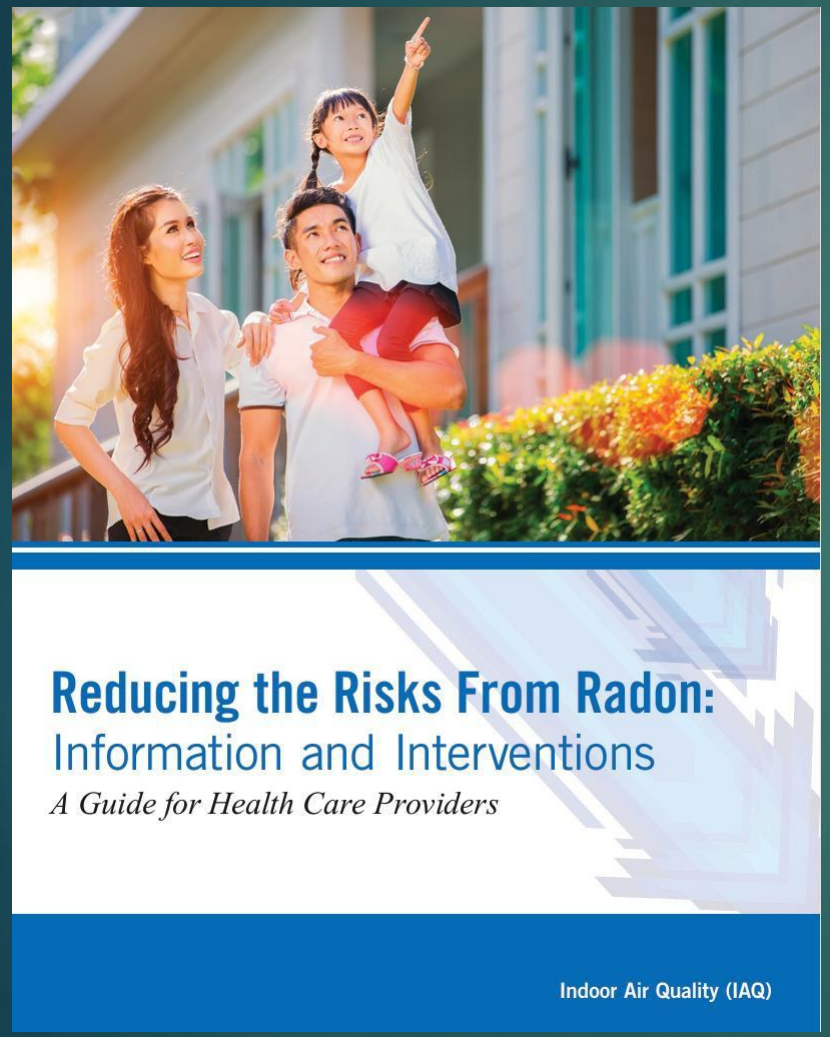




Much cheaper in building radon resistant design in new construction.

Can be as as much as 10-20 time cheaper than installing a mitigation system after the building is constructed.

A Guide for Health Care Providers and Patient Health History Form



The Role of Health Care Providers in Reducing the Burden of Radon-Induced Lung Cancer

The homes of health care providers have some of the highest rates of radon testing. Testing for radon reduces the risk of developing lung cancer. Lung cancer's very high incidence rate and associated mortality rate are even more tragic because lung cancer is preventable. This is why, in addition to encouraging patients to stop smoking, it is important for health care providers to educate their patients about radon and encourage radon testing of their homes. One way to do this is for physicians and other health care providers to include questions about radon testing on their patient history forms. A brief encounter and resulting intervention can have lifelong consequences for patients and their families. Because health care providers are the primary advisors on health and disease prevention, they are in a unique position to play a vital role in informing the public about the serious risk posed by protracted radon exposure and in providing educational resources and contacts for radon testing and remediation methods for reducing elevated indoor radon levels.

Do you smoke? ☐ Yes ☐ No

If yes, how much per day?_____

If you are a former smoker, when did you stop?_____

Have you tested your home for radon? ☐ Yes ☐ No

Do you have a living will or advance medical directive? ☐ Yes ☐ No

https://www.lung.org/getmedia/5bcf2d08-f74e-49e3-be0f-612515291eec/reducing-the-risks-from-radon.pdf.pdf


“
Primary care visits serve as key opportunities to ask about home radon levels and educate patients.
Dr. Timothy Mullett
Medical Director, Markey Cancer Center Affiliate Network at the University of Kentucky
CDC
CS345577-A
www.cdc.gov/radon

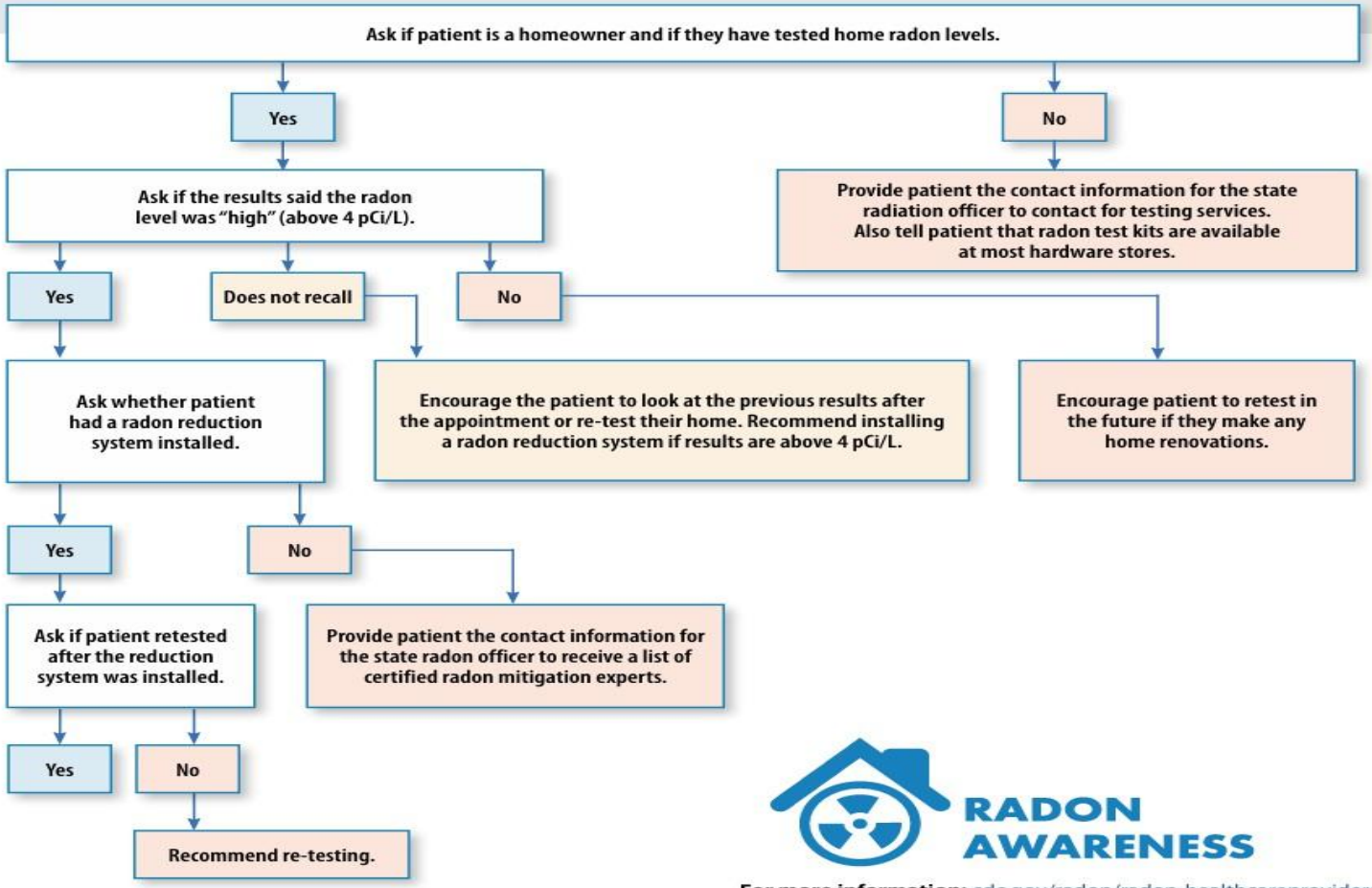
Talk to Your Patients about Radon

Accessible link: https://www.cdc.gov/radon/talk-to-your-patients.html

Radon is the leading environmental cause of cancer deaths in the United States. Long-term exposure to high radon levels can cause lung cancer, including in people who have never smoked. The Environmental Protection Agency estimates that 21,000 people die from radon-associated lung cancer each year.

Patients can prevent radon-associated lung cancer by testing their homes and installing radon reduction systems, if needed. Unfortunately, there is a lack of awareness about radon in the general population. As a clinician, you can help protect your patients from this risk through education and recommendations based on their specific situation.

Below is a decision tree to help guide your patient interactions about radon. You may want to begin by telling your patient about the health effects from radon exposure, or sharing educational materials. Free resources are available on CDC's Radon Communication Materials webpage (www.cdc.gov/radon/communications/index.htm).



RADON AWARENESS

For more information: cdc.gov/radon/radon-healthcareproviders

CS 335799-A 11/22/2022

Consider having hospitals and doctors' offices display radon risk/testing video messaging on their TV screens.

CONCLUSION AND CALL FOR ACTION

- **Recommendation that all diagnosed lung cancer patients undergoing treatment have their homes tested for radon. Guidance can be provided**
- **Home-use continuous radon monitors can be used to monitor the radon levels in the patient's home.**
- **Remember, the best solution for elevated radon levels is to have a radon mitigation system installed.**
- **Consider testing hospitals, urgent care centers, senior care centers, gyms, and childcare built environments.**

SunRADON luft

Airthings Wave Home Use Radon Detector

Ecosense Radon Eye/EcoCube

Recommended possible radon studies and projects

- Radon gas (monatomic) can be absorbed into the bloodstream, particularly in children, in built environments and gyms. This exposure may be linked to blood-related cancers.
- Radon gas (monatomic) can be absorbed into the bloodstream, particularly in children, in built environments and gyms. This exposure may be linked to blood-related cancers.
- **A potential for nurses and community health workers to alert communities and provide communities with radon risk reduction outcomes, combined with other IAQ Health Homes risk**
- **Provide a national certification training program for nurses on "radon risk reduction (Could be co-partner certification with the national radon certification program and states (NRPP/IEA)**
- **Provide free radon mitigation for medically underserved communities**
- **Basic children's elementary school nurses training module on "PROTECTING YOUR LUNGS NOW AND FOR THE FUTURE DREAMS."**
- **"I want to play in sports. I want to be a singer. I want to be in the trades. I want to be a doctor or nurse…."**

MOVES FOR RADON EJ

1. **Communicate radon risks and the importance of radon testing to medically underserved communities**
2. **Any identified elevated radon house is mitigated at no cost to the homeowner/landlord. (Avg. cost for mitigation: $1500)**
3. **Homeowners/occupants are provided with training/tools on improving indoor air quality**
4. **WITHOUT BUILT-IN RADON MITIGIATION, THEN YOU'RE NOT PROVIDING REAL RADON RISK REDUCTION TO THOSE IMPACTED FAMILIES AND COMMUNITIES**

"One kind deed is more beautiful than a thousand good intentions." - **Matshona Dhliwayo**

Subject Matter Expert

Fide Pineda Sandoval, MPH, CHES

Training & Technical Assistance Manager, National Center for Health in Public Housing

E-mail: fide@namgt.com

Radon Mitigation Strategies for Health Centers

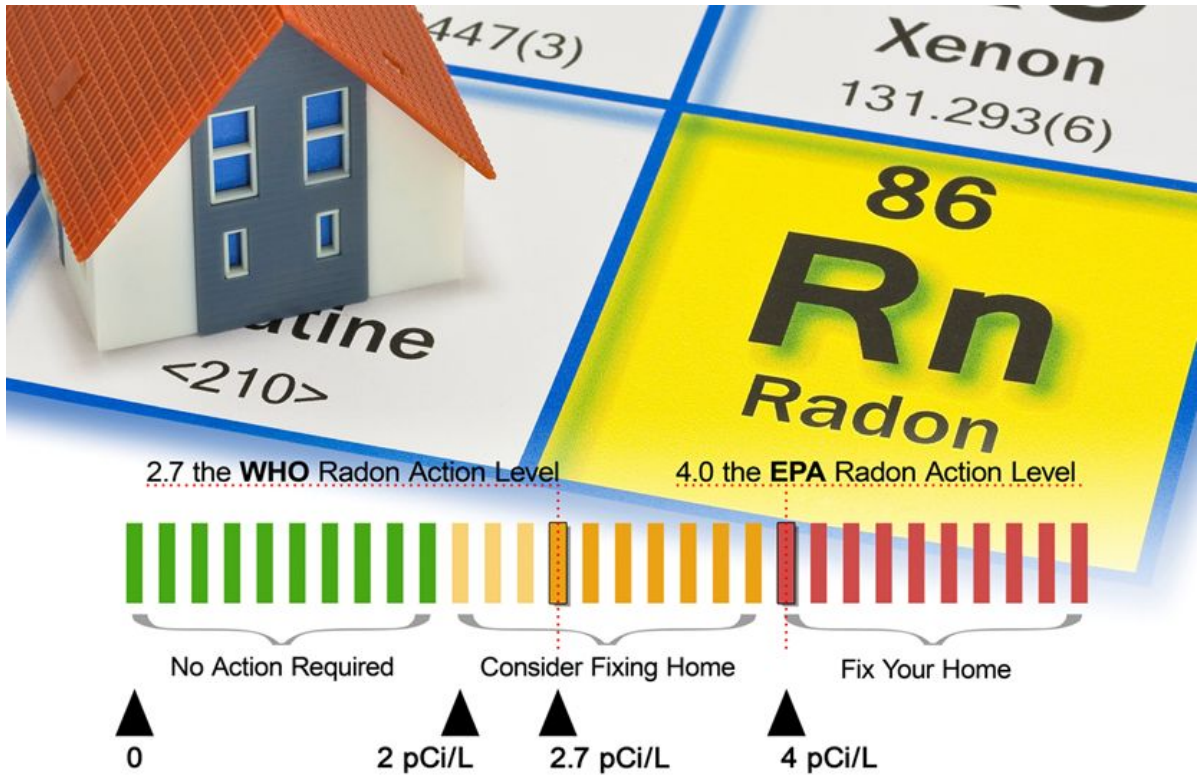
Screening Strategies in Health Center Settings

- Include home environment health questions (housing type, basement use, prior radon testing) in patient intake, risk assessments, and nonclinical needs screenings.
- Identify patients residing in high-risk housing (public housing, multi-unit buildings, older buildings).
- Use referrals and follow-up workflows for radon testing.

Source: EPA Radon; CDC Radon

Patient and Community Education Approaches

- Explain radon risks using plain language and community-focused materials.
- Educate patients on home testing options and EPA action levels.
- Leverage community health workers to support outreach and follow-up.



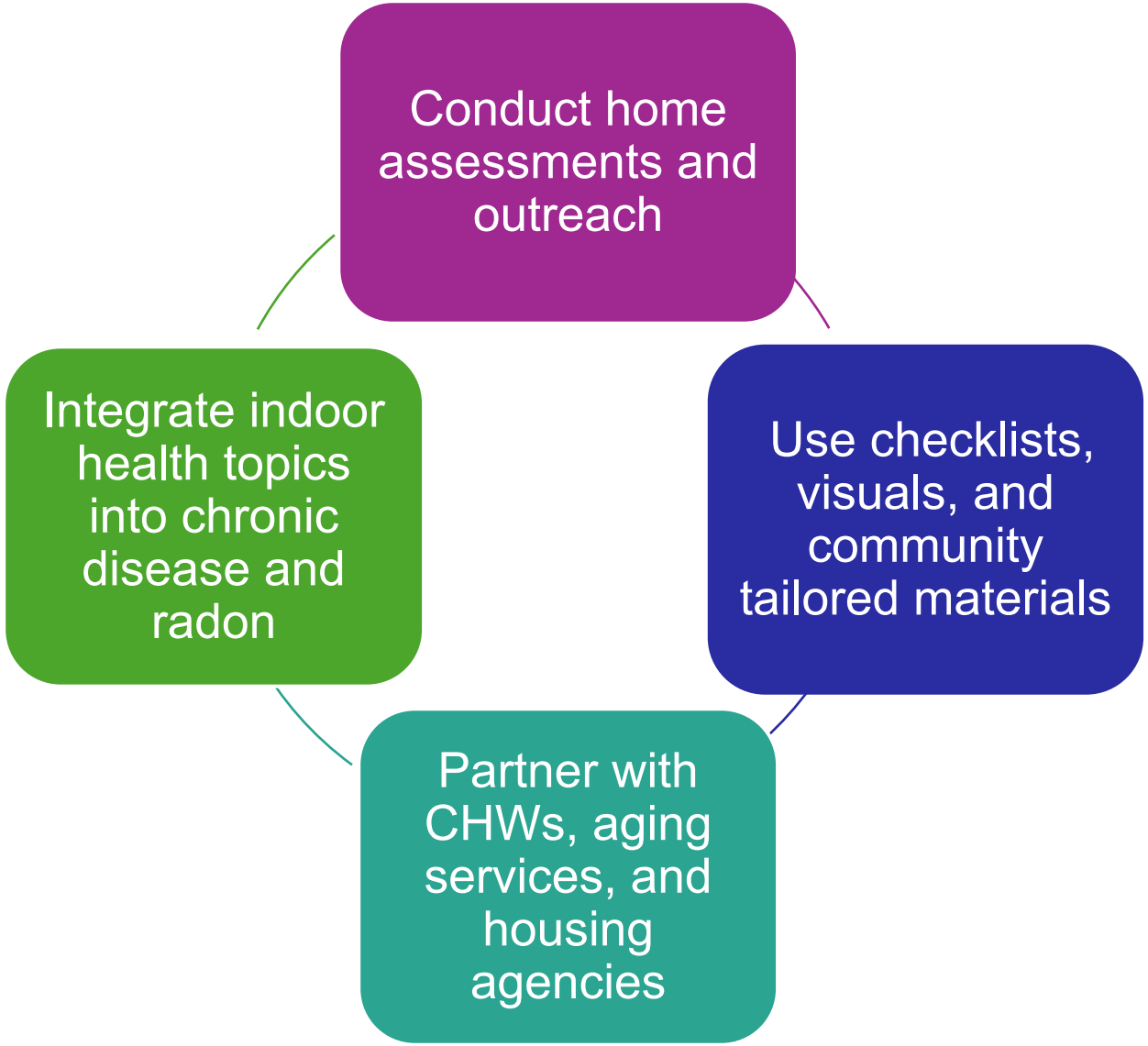
Source: EPA Radon Mitigation; EPA Radon Action Level

Partnering with External Partners

- Collaborate with state and local radon programs and environmental health agencies.
- Engage housing authorities, property managers, and public housing partners.
- Integrate radon efforts into broader community health needs and chronic disease initiatives.

Source: EPA Radon Zones and Supplemental Information

Role of Health Educators and CHWs



Identifying Health Hazards

- Provide in-home assessments
- Identify health and safety hazards
- Provide guidance to address hazards
- Conduct interviews with residents and health center patients on illness management

Source: *A Cost-Benefit Analysis of a State-Funded Healthy Homes Program for Residents With Asthma: Findings From the New York State Healthy Neighborhoods Program*

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Using Checklists

- Employing picture cards & handouts
- Manuals designed for medically underserved communities
- Booklets that are community-focused

Source: *National Heart Lung and Blood Institute. (2025). Resources for Community Health Workers.*

Partner with CHW Organizations

- Liaisons that bridge gaps between residents and various community resources
- Serve as resource navigators

Source: *National Heart Lung and Blood Institute. (2025). Resources for Community Health Workers.*

Integrating Prevention Programs

- Helping residents understand how to better manage their chronic conditions.
- Provide referral to outpatient services

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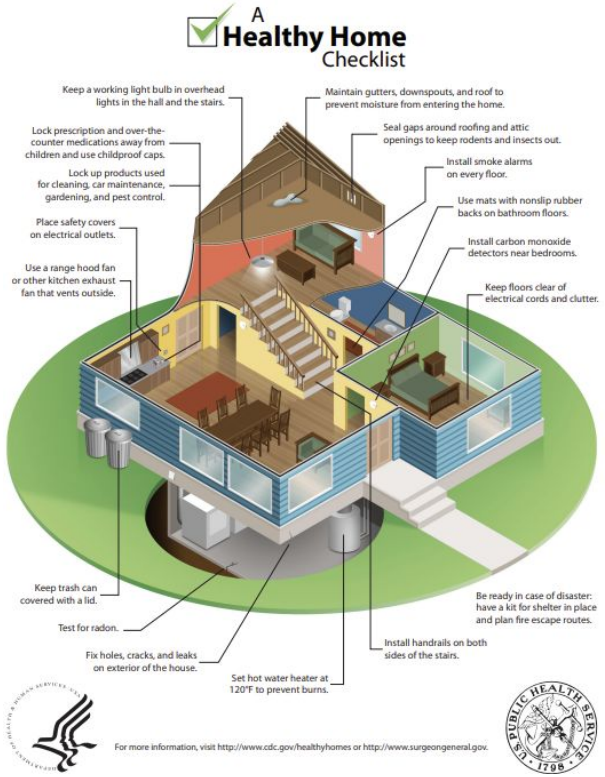
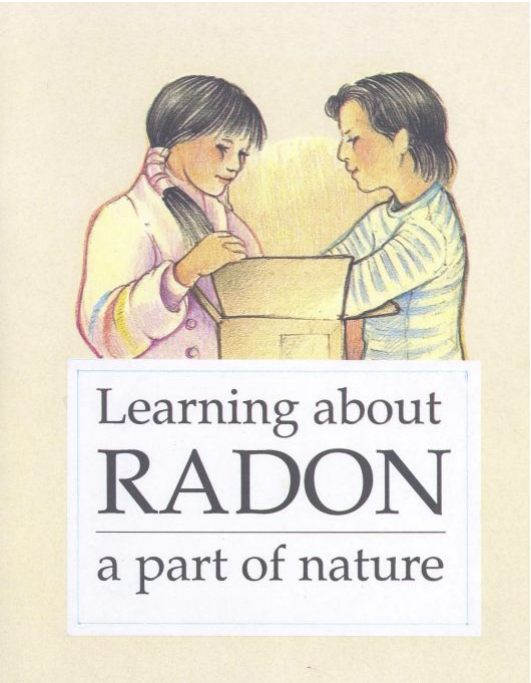
Source: Leading Age LTSS Center at Umass Boston. (2021). Bringing Community Health Workers to Senior Housing.

Resources for Health Centers

- A Healthy Home Checklist – HHS
- Healthy Housing Toolkit for Counselors
- EPA Radon Publications, Webinars, and Videos
- Do-It-Yourself Healthy Homes Check Up
- Free Radon Testing Kits from Local Health Departments – Directory of Local Health Departments





Questions?

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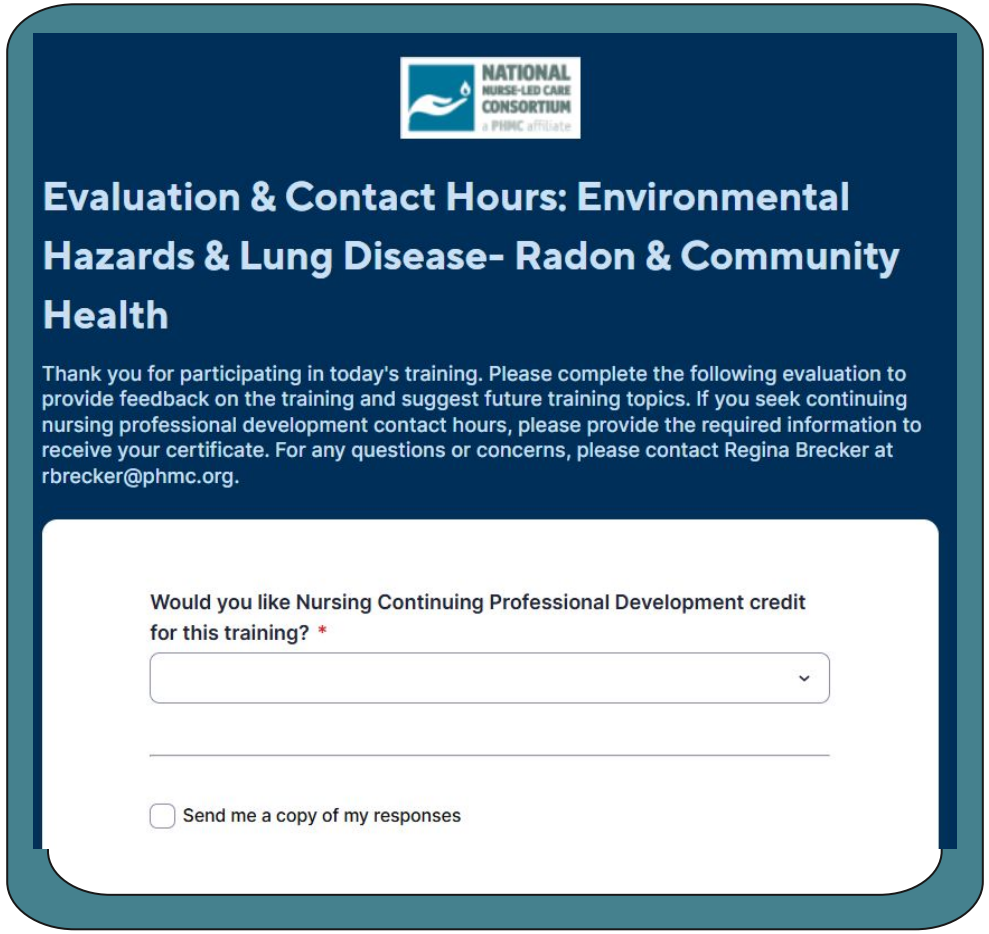
Evaluation



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Evaluation & Contact Hours: Environmental Hazards & Lung Disease- Radon & Community Health

Thank you for participating in today's training. Please complete the following evaluation to provide feedback on the training and suggest future training topics. If you seek continuing nursing professional development contact hours, please provide the required information to receive your certificate. For any questions or concerns, please contact Regina Brecker at rbrecker@phmc.org.

Would you like Nursing Continuing Professional Development credit for this training? *

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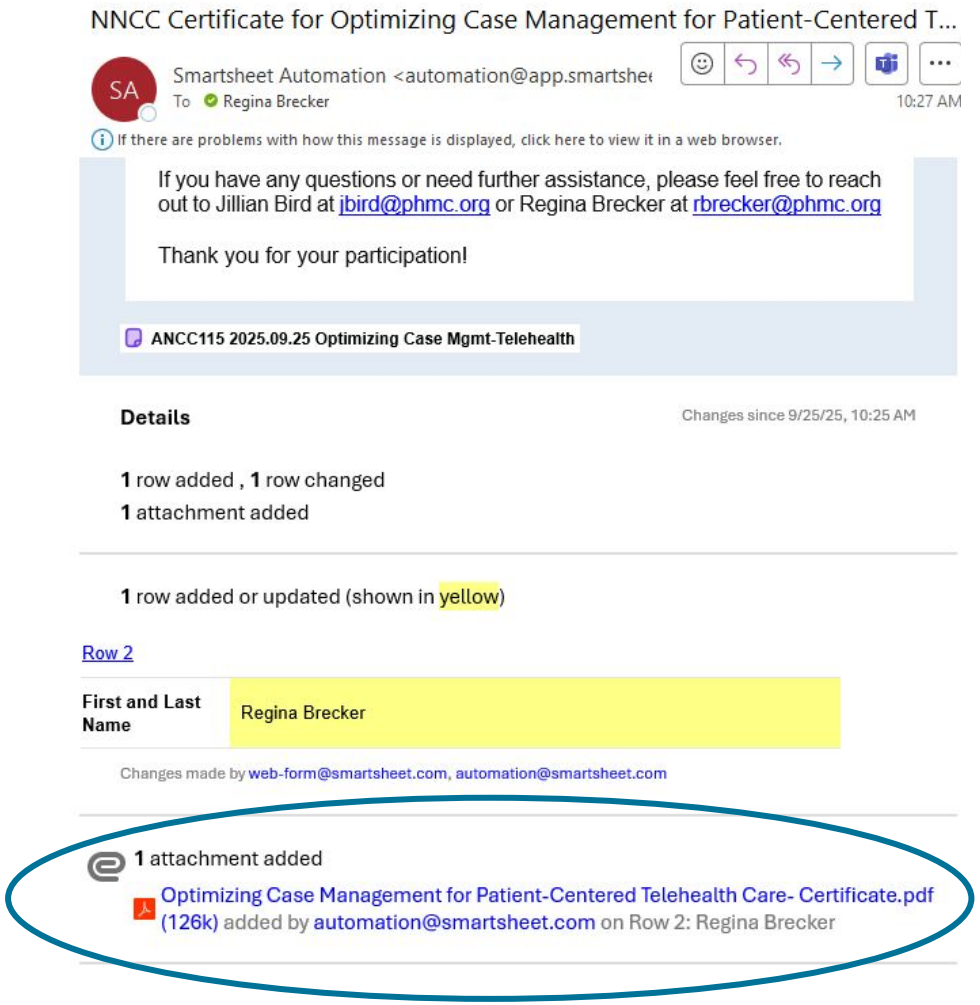
Certificate

Once you submit the evaluation, please wait approximately **20 minutes** for your certificate to arrive. It will come from “Smartsheet Automation,” and be linked at the **very bottom of the email** (as seen below). You will not need to request access.


NNCC Certificate for Optimizing Case Management for Patient-Centered T...

SA Smartsheet Automation <automation@app.smartshee
To Regina Brecker 10:27 AM

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If you have any questions or need further assistance, please feel free to reach out to Jillian Bird at jbird@phmc.org or Regina Brecker at rbrecker@phmc.org

Thank you for your participation!

ANCC115 2025.09.25 Optimizing Case Mgmt-Telehealth

Details Changes since 9/25/25, 10:25 AM

1 row added , **1** row changed
1 attachment added

1 row added or updated (shown in yellow)

Row 2

First and Last Name	Regina Brecker

Changes made by web-form@smartsheet.com, automation@smartsheet.com

1 attachment added
Optimizing Case Management for Patient-Centered Telehealth Care- Certificate.pdf (126k) added by automation@smartsheet.com on Row 2: Regina Brecker

Access Health Center Resources

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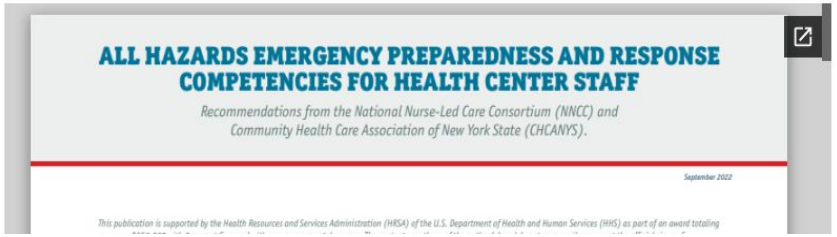
All Hazards Emergency Preparedness and Response Competencies for Health Center Staff

To successfully perform their assigned emergency/disaster roles, health center staff must understand how their organization will respond to hazards, including the use of altered management structures and modified operations. The National Nurse-Led Care Consortium (NNCC) and the Community Health Care Association of New York State (CHCANYS) created a set of competencies to improve the emergency and disaster preparedness of all health center staff. This publication provides a comprehensive overview of those competencies and sub-competencies, as well as a description of their development process. The competencies are intended to form the foundation of health center staff education and preparedness for all-hazards emergency and disaster response and will allow health centers to direct their limited training time and resources to cover the most essential preparedness aspects.



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Upcoming Trainings

March 4, 2026 – 3 pm EST

- Comprehensive Case Management for Prenatal Care in Health Centers: Improving Access and Outcomes
- Registration: https://us02web.zoom.us/webinar/register/WN_tZvwoSTTT3-ey4vVznEgmg

March 5, 2026 – 3 pm EST

- Expanding Access: Leveraging Patient Support Services to Increase Cancer Screening Rates
- Registration: https://us02web.zoom.us/webinar/register/WN_B8A7zQ1XTbqemrnfPh8cWg

March 11, 2026 – 2 pm EST

- Health Center Preparedness & Response Forum Series - Workforce Readiness
- Registration: https://us02web.zoom.us/webinar/register/WN_8c4vJMkpS_uL7Bnl7X6Hsw

Thank You!

If you have any further questions
or concerns please reach out to
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