

Welcome to the
January 2023
Statewide Wellness
Virtual
Lunch and Learn

Hosted by:
OSHR Worksite
Wellness

For future wellness lunch and learn events,
or recordings of previous events, visit
<https://oshr.nc.gov/wellness-webinars>.

Let's LUNCH AND LEARN!



NC Department of Health and Human Services

Preventing Radon-Induced Lung Cancer

Phillip Ray Gibson

NC Radon Program Coordinator

NC Radiation Protection Section

NC Division of Health Service Regulation



JANUARY IS NATIONAL RADON AWARENESS MONTH

What is Radon? Radon is a cancer-causing radioactive gas that might be in your home. You can't see, smell or taste it.

Radon is the second leading cause of lung cancer after smoking.

***TEST YOUR HOME
FOR RADON TODAY!***

[Radon-Lung-Cancer-Factsheet.pdf](#)

Preventing Lung Cancer from Radon



NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**
Division of Public Health



**Comprehensive
Cancer Control**
Collaborating to Conquer Cancer
— NORTH CAROLINA —

NORTH CAROLINA



Advisory Committee
on Cancer Coordination and Control

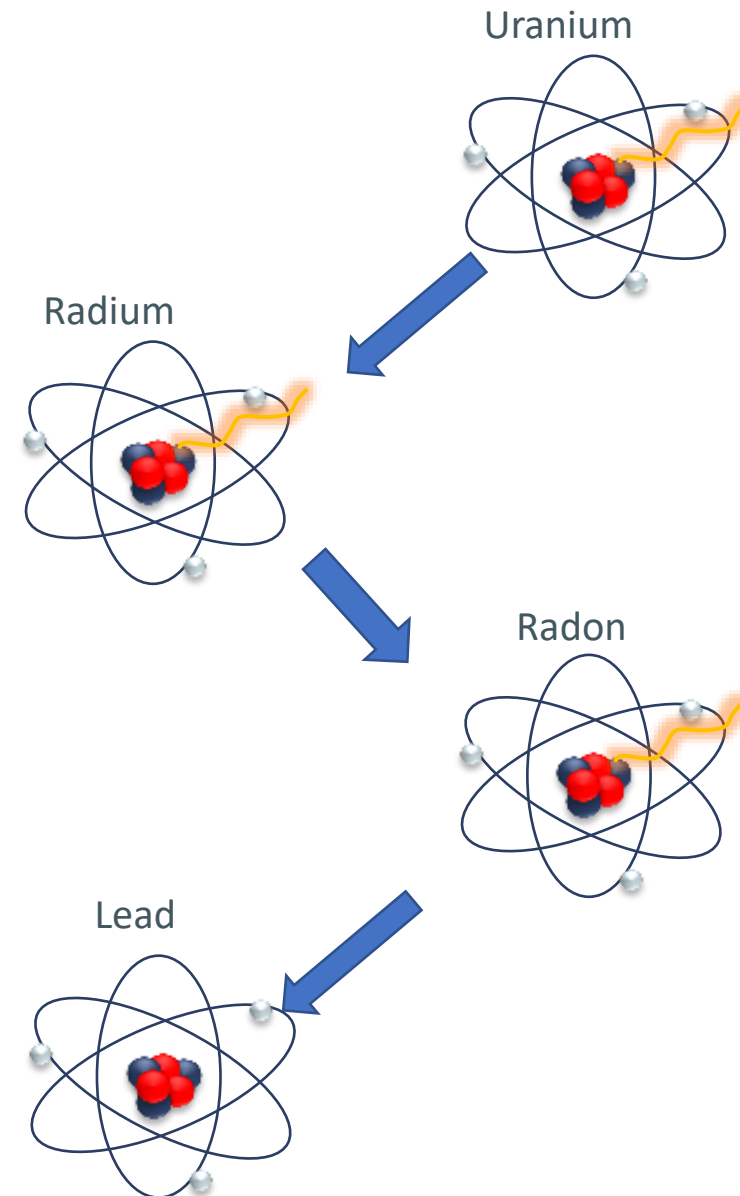
Objectives

www.radon.ncdhhs.gov

- What and Where is Radon?
- Why is Radon a Health Concern?
- How to Test for Radon?
- Who Needs this Information?

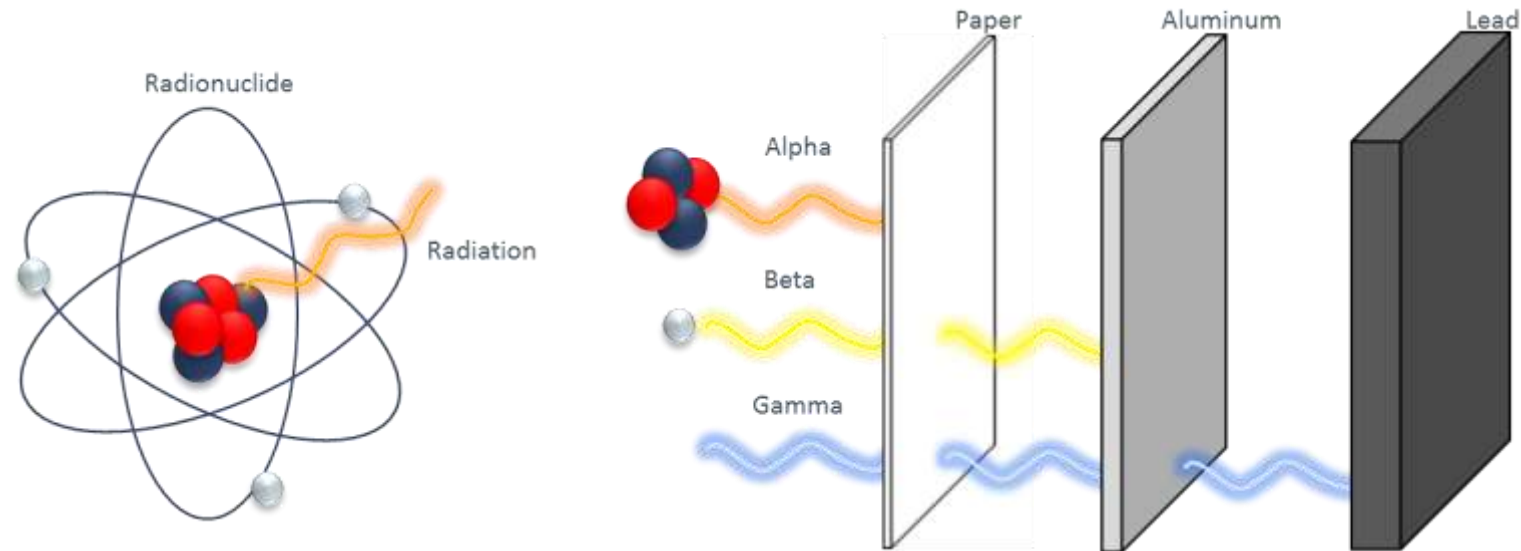
What is Radon?

- Alpha Particle
- Naturally occurring gas
- Cannot be seen or smelled
- Primarily comes from underlying geology but can come from building materials
- Prolonged exposure increases the risk for lung cancer



What is Radon?

- During the decay process, energy is released in the form of radiation.
- Radiation can be in the form of alpha, beta or gamma emissions.
- These particles are what can lead to adverse health effects.



What is Radon?

www.radon.ncdhhs.gov



Radon can be elevated in all buildings residential and commercial

Radon can accumulate to high concentrations in the home. This depends on radon concentrations in the soil (source), how radon enters the home (pathways), and pressure differences between the outside air and the inside air (air pressure) that drive radon into the home.

Source

In North Carolina, soil is the main source of radon, where it occurs naturally. There are, however, high-rise and commercial structures that are built with materials that contain uranium.

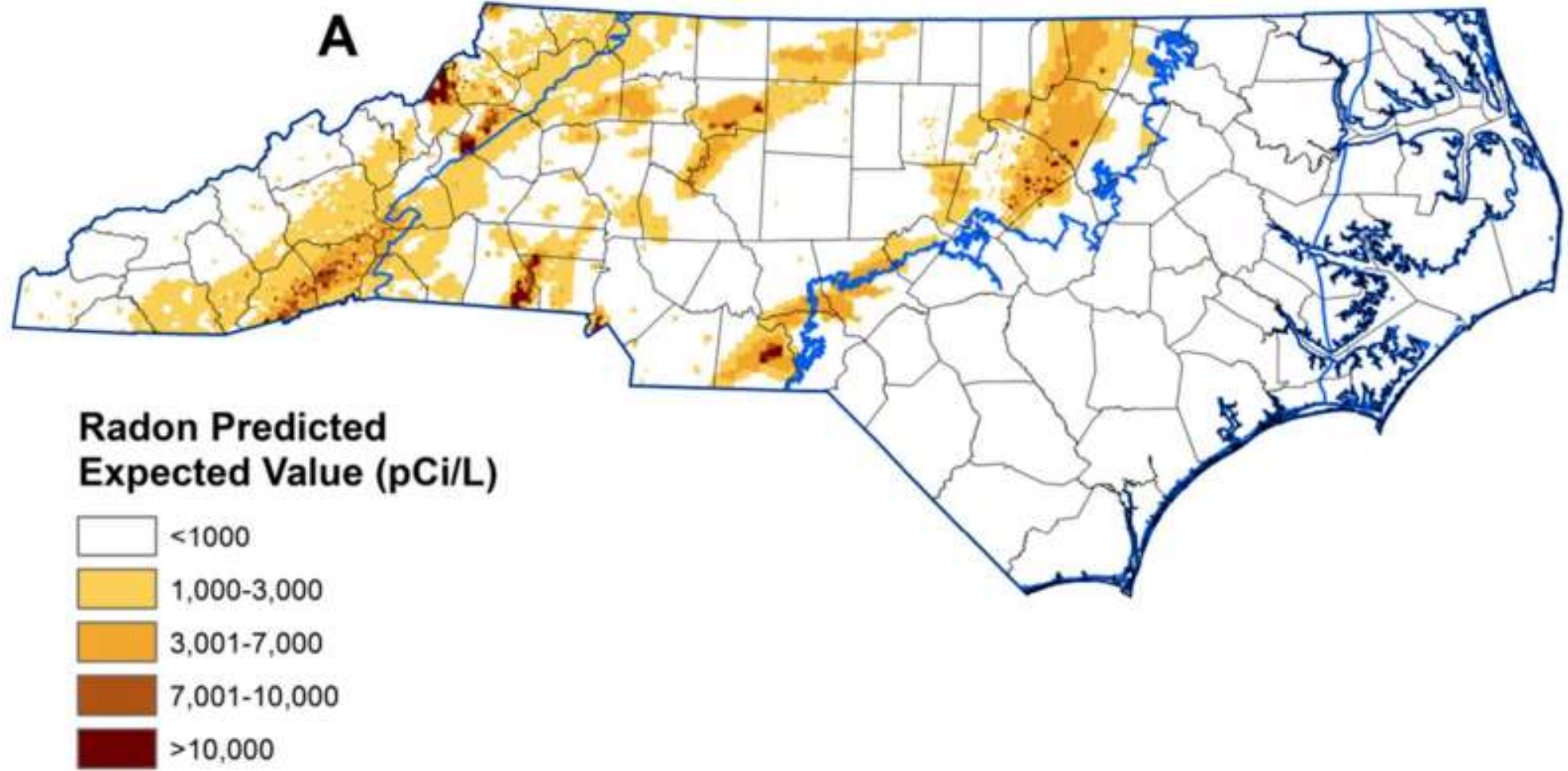
Pathways

Openings, cracks in concrete slab, floor-wall joints, crawl space, or private well water.

Air Pressure

Difference in air pressure between the home's interior and the soil can pull radon gas into the home through the pathways.

Source

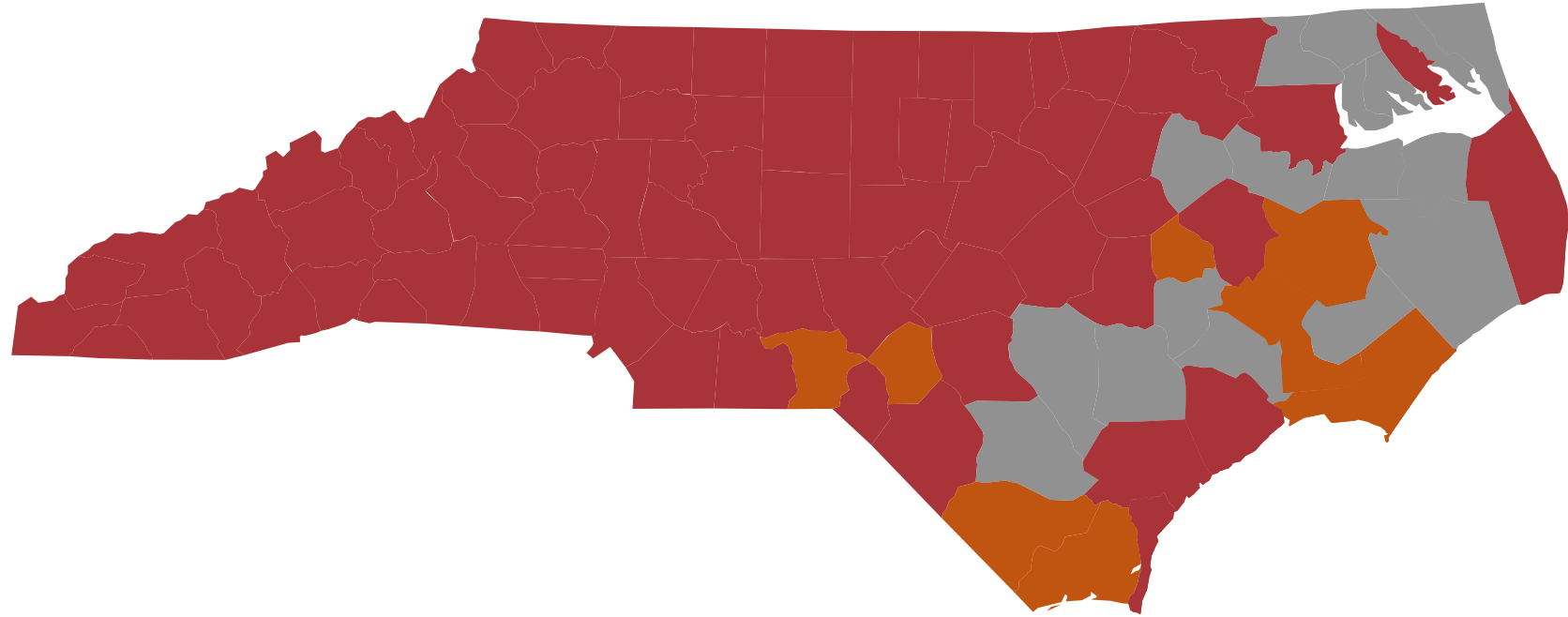


Messier, K. P., Campbell, T., Bradley, P. J., & Serre, M. L. (2015). Estimation of groundwater Radon in North Carolina using land use regression and Bayesian maximum entropy. *Environmental science & technology*, 49(16), 9817-9825.

Red: Highest level is 4 pCi/L or more

Orange: Highest Level is 2 pCi/L or more

Gray: Levels under 2 pCi/L



www.radon.ncdhhs.gov

Pathways

Radon can enter your home in many ways:

- Cracks in solid floors
- Construction joints
- Cracks in walls
- Gaps in suspended floors
- Gaps around service pipes
- Cavities inside walls
- The water supply



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HUMAN SERVICES**
Division of Health Service Regulation

radon.ncdhhs.gov

ADAPTED FROM A EPA GRAPHIC.

Air Pressure

Homes commonly operate at a lower ("negative") pressure compared to the outside air. Air pressure differences between the home and outside air create a vacuum and pull air into the home. Air can be pulled into the home through walls, windows, doors or from the soil. And soil can contain radon gas. There are three main factors that contribute to these air pressure changes.



1. **Stack Effect** – Warm air rises to the upper part of the home and is lost to the outside air. Make-up air enters the lower part of the home. Some of that make-up air comes from the soil.



2. **Down Wind Draft Effect** – Strong winds can blow over the top of the home, pushing and pulling air into and out of the house.



3. **Vacuum Effect** – Appliances (water heaters, fireplaces, clothes dryers, older furnaces, etc.) and exhaust fans remove air from the home. This can drive soil gas into the home as make-up air enters from the lower part of the house.

[Radon: Keeping you safe from radon \(state.mn.us\)](http://state.mn.us)

Foundations

Any home can have a radon problem, no matter the type of foundation.



A **basement** provides a large surface area in contact with the soil, where radon can enter through different pathways. Taller homes have the potential for a greater stack effect.

Homes built **slab-on-grade** have many openings that allow radon to enter, similar to a basement.



Homes built with **crawl spaces** are directly connected to the soil and create a pathway for radon to enter the home.

Manufactured homes with solid skirting act like crawl spaces and provide a direct connection to the soil.



Does my home
have elevated
radon?

www.radon.ncdhhs.gov

Protect your Family from Radon
Radon is a gas that you can't **see**, **smell**, or **taste** – but it can be dangerous. It's the second leading cause of lung cancer.

1 OUT OF 15 HOMES HAS HIGH RADON LEVELS



Learn more by calling the National Radon
Hotline: 1-800-SOS-RADON (1-800-767-7236)



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radon.ncdhhs.gov
ADAPTED FROM A CDC GRAPHIC.

What is the Risk for Radon- Induced Lung Cancer?

What influences my risk for lung cancer?

- Average level of radon that you are exposed to
- Length of time you are exposed to that average level
- Are you a Never smoker or an Ever smoker

What is the Risk for Radon-Induced Lung Cancer?

Lifetime Risk of Lung Cancer Death from Radon Exposure in Homes

Risk Is Shown per 100,000 Individuals

RADON LEVEL (pCi/L)	NEVER SMOKERS	CURRENT SMOKERS	GENERAL POPULATION
20	3,600	26,000	11,000
10	1,800	15,000	5,600
8	1,500	12,000	4,500
4	730	6,200	2,300
2	370	3,200	1,200
1.25	230	2,000	730
0.4	73	640	230

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

Never Smokers 7/1000 | Smokers 62/1000

21,000 National
Annual Average

450 North
Carolina Average

Cancer Mortality 2020	
Cancer Type	Estimated U.S. Deaths in 2020 ^{4,5}
1. Lung and Bronchus	135,720
2. Colon and Rectum	53,200
3. Pancreas	47,050
4. Breast	42,690
5. Prostate	33,330
6. Liver and Intrahepatic Bile Duct	30,160
7. Leukemia	23,100
Radon-Induced Lung Cancer	21,100*
8. Lymphoma (Combined Hodgkin & Non-Hodgkin)	20,910
9. Brain & Other Nervous System	18,020
10. Urinary Bladder	17,980
11. Esophagus	16,170
12. Kidney and Renal Pelvis	14,830
13. Ovary	13,940

* The 21,100 radon-induced lung cancer deaths, based on risk estimates using U.S. demographic information from 1995, are included in the estimate of lung and bronchus cancer deaths.

2020-2025
North Carolina
Comprehensive
Cancer Control
Action Plan



www.radon.ncdhhs.gov



2020-2025 North Carolina Comprehensive Cancer Control Action Plan

www.radon.ncdhhs.gov



 RISK FACTORS	 PREVENTIVE ACTIONS
<p>Exposure to some environmental substances like radon, ultraviolet rays and asbestos can cause cancer. While people can reduce their exposure to the sun, other hazards may be harder to avoid. They are in the air, drinking water, food or materials at work. Many factors, like the amount and length of exposure and a person's background, influence whether a person develops cancer.</p> <ul style="list-style-type: none"> • Radon is a naturally occurring gas that can only be detected by testing. It is found in all North Carolina counties. According to the National Cancer Institute, long-term radon exposure is the second leading cause of lung cancer in the United States. It is the leading cause of lung cancer in non-smokers.¹⁶ • Ultraviolet rays can cause early aging of the skin and some skin cancers. Ultraviolet rays come from the sun and from artificial exposures like tanning beds and sun lamps. There are three types of skin cancer: melanoma, basal cell and squamous cell. Melanoma is the most serious form of skin cancer. It accounts for about one percent of all skin cancers but causes the most skin cancer deaths.¹² • Arsenic is a naturally occurring element which is odorless and tasteless. It can be found in smoking tobacco and contaminated water. Long-term exposure can cause bladder, skin, lung, liver, kidney and other types of cancers. • Cancer from benzene, beryllium, asbestos and vinyl chloride may occur from industrial exposures. Benzene is also found in cigarette smoke. 	<p>Minimizing exposure to environmental risk factors will reduce cancer risk.</p> <p>Individuals</p> <ul style="list-style-type: none"> • Test homes, worksites and schools for high levels of radon. Mitigate, if necessary. • Avoid exposure to pesticides and other chemicals at home. • Reduce exposure to cancer-causing substances at work. • Use sunscreen and protective clothing when outdoors. • Protect children from sunburns as early sunburns may increase the risk of skin cancer in adulthood. <p>Communities</p> <ul style="list-style-type: none"> • Urge employers, school administrators and business leaders to test buildings for high levels of radon. Mitigate, if necessary. • Follow health and safety rules to avoid exposures to cancer-causing substances. • Urge employers to survey their worksites to determine the workers' exposure to chemical hazards. Correct those exposures, as necessary. • Urge employers to provide sun protection clothing for employees who work outside. • Provide shaded areas for recreation and work. • Use signage to encourage sunscreen use and sun protection.

**Environmental exposures
increase cancer risk.¹²**
lung • skin • bladder • liver • kidney

Radon can be elevated in all buildings residential and commercial

www.radon.ncdhhs.gov

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- Construction joints
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ADAPTED FROM A EPA GRAPHIC.

Testing is the
only way to
know if you
have a high
radon level

www.radon.ncdhhs.gov



Testing

The only way to
determine if your
home has high
radon levels

**RADON
TEST
IN PROGRESS**



radon.ncdhhs.gov

Adapted from a CDC graphic.

How to Use the Test Kit



How to Use the Test Kit

Start Test

REMOVE PLASTIC SLEEVE

1 Write on Kit

Use a pen, not a pencil.

Record your device number

Write your name, address, and email, placing one letter or number in each box

Fill in the start day and start hour

To access test results online, you MUST record the sampler serial number below.

2 Prepare the kit

[GRIP] securely at top and bottom

>PINCH< gently at top until cardboard folds at perf

PUSH ensure a snug fit all around



Radon gas easily passes through the draft-shield

3 Hang the Kit

at breathing level (2-5 ft from floor) away from drafts, heat sources, and out of direct sunlight. Your thermostat would be an ideal location.



See reverse side for more details.

Questions or problems? Details and videos are online: www.radon.com/instructions

End Test

AFTER 3-7 DAYS

1 Write on Kit

Use a pen, not a pencil.

Fill in end day and end hour

Fill in answers to ALL remaining questions below

2 Recycle hook and cardboard

or discard - do not leave inside



3 Seal the Kit

to ensure no radon escapes

PEEL and remove adhesive strip

PRESS together to form air-tight seal



You're Done!
Now Return Your Kit to Lab

THE SOONER THE BETTER - USE FEDEX OR UPS NEXT DAY FOR BEST RESULTS
SEE REVERSE SIDE FOR DETAILS



How to Use the Test Kit

IS YOUR HOME SAFE?



**SHORT-TERM
RADON AIR TEST**

**UNFOLD FOR
COMPLETE INSTRUCTIONS**

Keep plastic sealed until ready to use

USE TWO (2) FOR REAL ESTATE TESTS

Air Check
www.radon.com
800-AIR-CHEK

**HOW TO GET YOUR ANALYSIS
RETURNING YOUR KIT TO THE LAB**

After your test is completed (exposed for more than 3 days but less than 7), follow the ending instructions on the reverse side and return your sealed kit(s) to the lab for analysis as soon as possible. The sooner we got it back, the more accurate your results.

Radon gas decays quickly, so no results can be provided if your test kits take more than 12 days to arrive. For that reason, we recommend one of the following delivery methods for return:

- FedEx or UPS 3-day, 2-day, or Next Day delivery.
- USPS Express Mail
- USPS Priority Mail

For the most accurate analysis, return your test kit(s) to arrive at our lab within 4 days of test completion.

FedEx/UPS Address
Air Check
1938 Butler Bridge Road
Mills River, NC 28758

USPS Address
Air Check
PO Box 2000
Naples, NC 28760

Once we receive your sealed kit, you can enter its serial number at www.radon.com/results to check the status of your analysis.

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KIT PLACEMENT GUIDELINES
More details and videos at www.radon.com/instructions



Every space is different, but in general, hang the kit at eye level to knee level, avoid drafts, moisture, and direct sunlight.

IMPORTANT REMINDERS

BEFORE YOUR TEST

- Conduct your test before the "Use By" date
- Record the serial number of your test kit
- Clearly fill in the start date, time, and room temperature
- Clearly write your address and email address, writing one letter or number per box.
- Test the lowest livable area of the structure
- Hang the kit from the plastic hook; do not lay on a table

DURING YOUR TEST

- Keep ALL windows in the structure closed
- Close all doors behind you when entering or leaving
- Do not move the test kit once the test has begun.

AFTER YOUR TEST

- Clearly fill in the end date, time, and answer all questions
- Remove and recycle the plastic hook and cardboard insert
- Seal the kit after removing the cardboard insert
- Do not tear the kit, or the brown paper envelope inside
- Return the kit to our lab as soon as possible

FREQUENTLY ASKED QUESTIONS

WHEN IS THE BEST TIME TO TEST FOR RADON?

You can test your home for radon gas any time of the year, as long as you can maintain Closed House Conditions. This means all windows and exterior doors should stay closed for 12 hours before and during the test period. (You can still come and go during the test, just close the doors behind you.) Important: Don't test during severe weather – hard rains, heavy snows, strong winds.

WHERE SHOULD THE TEST BE PLACED?

The U.S. EPA suggests testing the lowest level used on a regular basis, or that could be used by a potential buyer. Pennsylvania residents should test the lowest LIVABLE area of a structure.

Hang the test kit around eye level where it will not be disturbed. You can use string to hang it from a central ceiling light or ceiling fan, or hang it on an interior, non-masonry wall at least 3 feet from windows, doors, hallways, exterior walls, and heat/AC vents. Keep out of direct sunlight and away from heat sources like stoves, fireplaces, and baseboard heaters.

AVOID testing in areas of high humidity like bathrooms, kitchens, laundry rooms, closets, or damp basements. If this is unavoidable, test for no more than 4 days.

For REAL ESTATE TRANSACTIONS, use two kits 8 inches apart. See www.epa.gov/radon for EPA Real Estate protocols.

CAN I RUN MY HEAT/AC DURING THE TEST?

Yes, just keep windows and doors closed. However, avoid creating a draft, so no fans of any sort (attic, ceiling, window, floor) for the duration of the test. Exception: Bathroom and kitchen fans are fine.

HOW LONG SHOULD I CONDUCT THE TEST?

This test kit is designed to be exposed for a minimum of 3 days (72 hours) and a maximum of 7 days (168 hours). Exposing it for shorter or longer will invalidate the test.

How to Use the Test Kit

HOW TO GET YOUR ANALYSIS RETURNING YOUR KIT TO THE LAB

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FedEx/UPS Address

Air Chek
1936 Butler Bridge Road
Mills River, NC 28759

USPS Address

Air Chek
PO Box 2000
Naples, NC 28760

Once we receive your sealed kit, you can enter its serial number at www.radon.com/results to check the status of your analysis.

Air Chek makes every reasonable effort to maintain the highest possible quality control during the manufacture and analysis of our test devices. However, we cannot control what the end-user does with or to our test devices when they are not in our possession. Our manufacturing, analysis, and reporting procedures include several checks and certification steps (such as double-entry of user-provided information). Therefore, we cannot provide a warranty of any kind, expressed or implied, including without limitation any implied warranty of merchantability or fitness with respect to any item furnished, information supplied, or services rendered by Air Chek. Before any action is taken on the basis of test results or analysis provided to you by Air Chek we recommend that further testing be conducted. Neither Air Chek nor any of our employees or agents shall be liable under any claim, charge, or demand, whether in contract, tort, or otherwise for any and all losses, costs, charges, claims, demands, fees, expenses, injuries, or damages (including without limitation incidental or consequential damages which are hereby excluded) of any nature or kind arising out of connection with, resulting from, or sustained as a result of any item furnished, information supplied, or service rendered to by Air Chek.

IN103 RevA

071221

IS YOUR HOME SAFE?



SHORT-TERM RADON AIR TEST

UNFOLD FOR COMPLETE INSTRUCTIONS

Keep plastic sealed until ready to use

USE TWO (2) FOR REAL ESTATE TESTS

Air Chek

www.radon.com

800-AIR-CHEK

How to Use the Test Kit

KIT PLACEMENT GUIDELINES

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How to Use the Test Kit

May 2024

USE ONLY BLUE OR BLACK INK

NAME

TEST ADDRESS

TEST STATE

TEST ZIP

EMAIL ADDRESS OR CELL PHONE NUMBER

START DATE

START TIME

END DATE

ROOM TEMP. +/- 5°F

FLOOR TESTED:

ROOM TESTED:

TESTING FOR:

REMINDER: NOON IS 12:00 PM

CRAWLSPACE VENTS OPEN?

CLOSED HOUSE CONDITIONS?

6989412

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

1	2	3	4	5	6	AM
7	8	9	10	11	12	PM

1	2	3	4	5	6	AM
7	8	9	10	11	12	PM

40 45 50 55 60 65 70 75 80

BASEMENT 1ST 2ND OTHER: _____

INITIAL FOLLOW UP REAL ESTATE POST-MITIGATION

YES NO




YES NO

YES NO

How to Use the Test Kit



Testing Guidance

Result (pCi/L)	Action
 0 – 1.9*	Retest every 2 to 5 years
 2 – 3.9	Consider a radon mitigation system
 4 or greater	Highly recommend a radon mitigation system

What Steps Do I Take if the Radon Level is High?

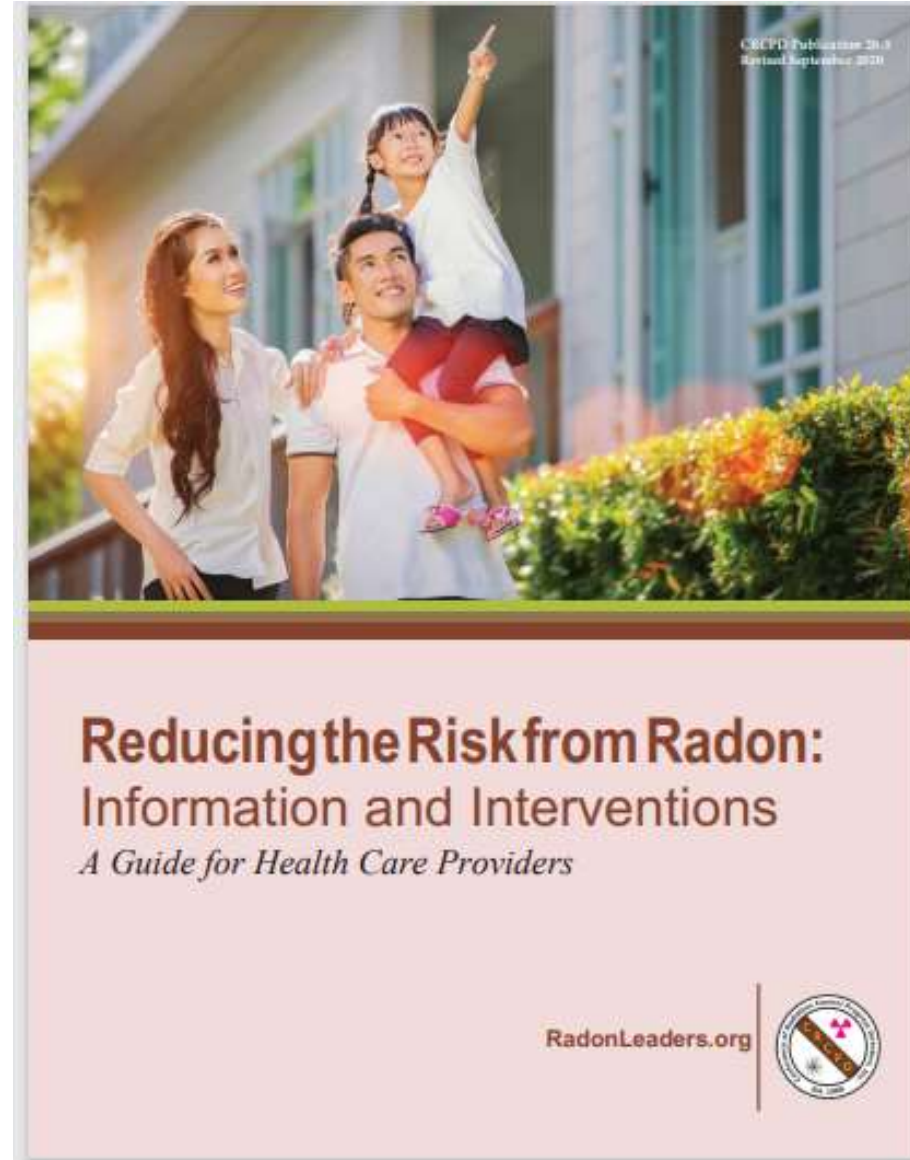
www.radon.ncdhhs.gov

Click on “Radon Mitigation”

Email Phillip.Gibson@dhhs.nc.gov

Radon Guide for Health Care Providers

www.radon.ncdhhs.gov



Radon Guide for Health Care Providers

www.radon.ncdhhs.gov



Talk to Your Patients

A home radon test now could prevent
a positive lung cancer test later.



NC DEPARTMENT OF
HEALTH AND
HUMAN SERVICES
Division of Health Service Regulation

radon.ncdhhs.gov

Adapted from a CDC graphic.

Learn the Risks
and Share Your
Knowledge

Prevent Lung
Cancer

www.radon.ncdhhs.gov



RADON AWARENESS

Learn the Risks

Invisible, odorless, tasteless... and risky

NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**
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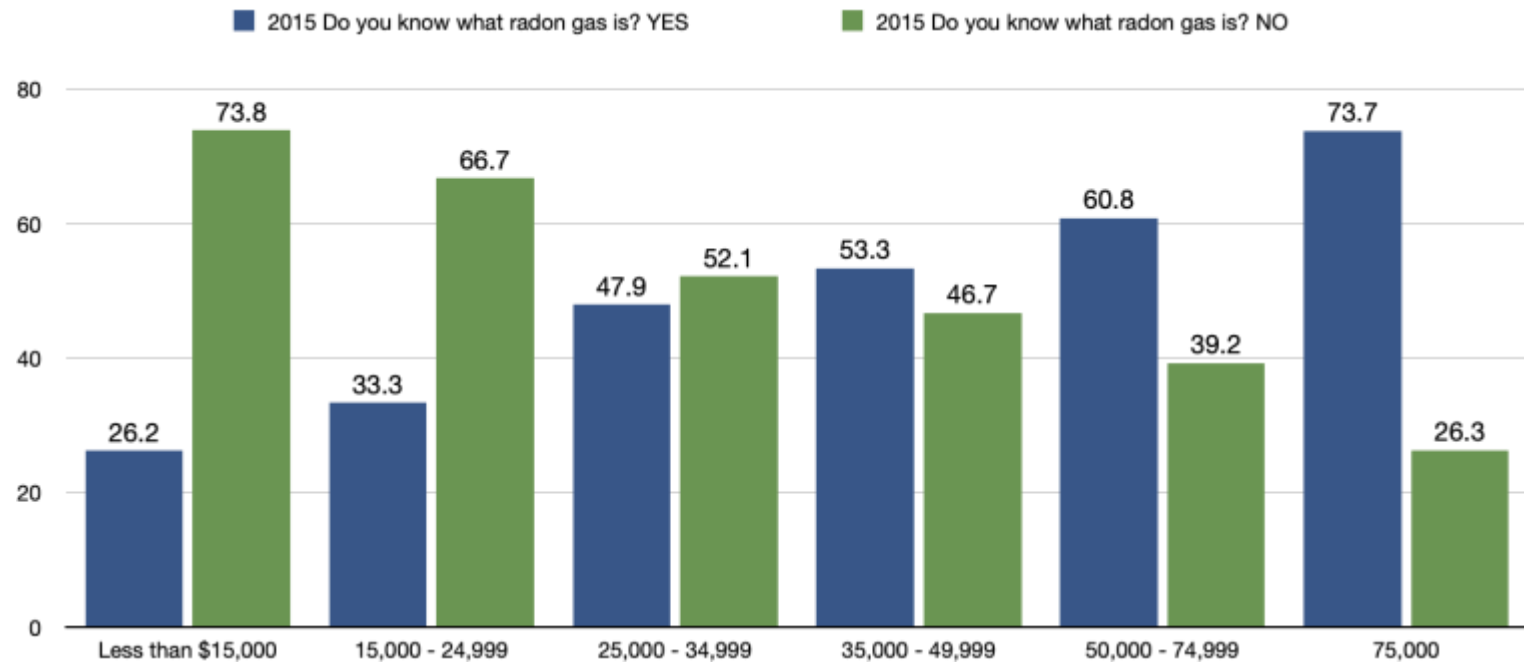
radon.ncdhhs.gov

Adapted from a CDC graphic.

The poster features a family of four (father, mother, and two children) sitting on a grey sofa in a living room. A lamp is on the left, and a television is on a stand to the right. A dashed line points from the father's chest area to a circular inset showing a pair of human lungs with a small red spot, indicating a health risk. The background is a light green wall with a pink floor.

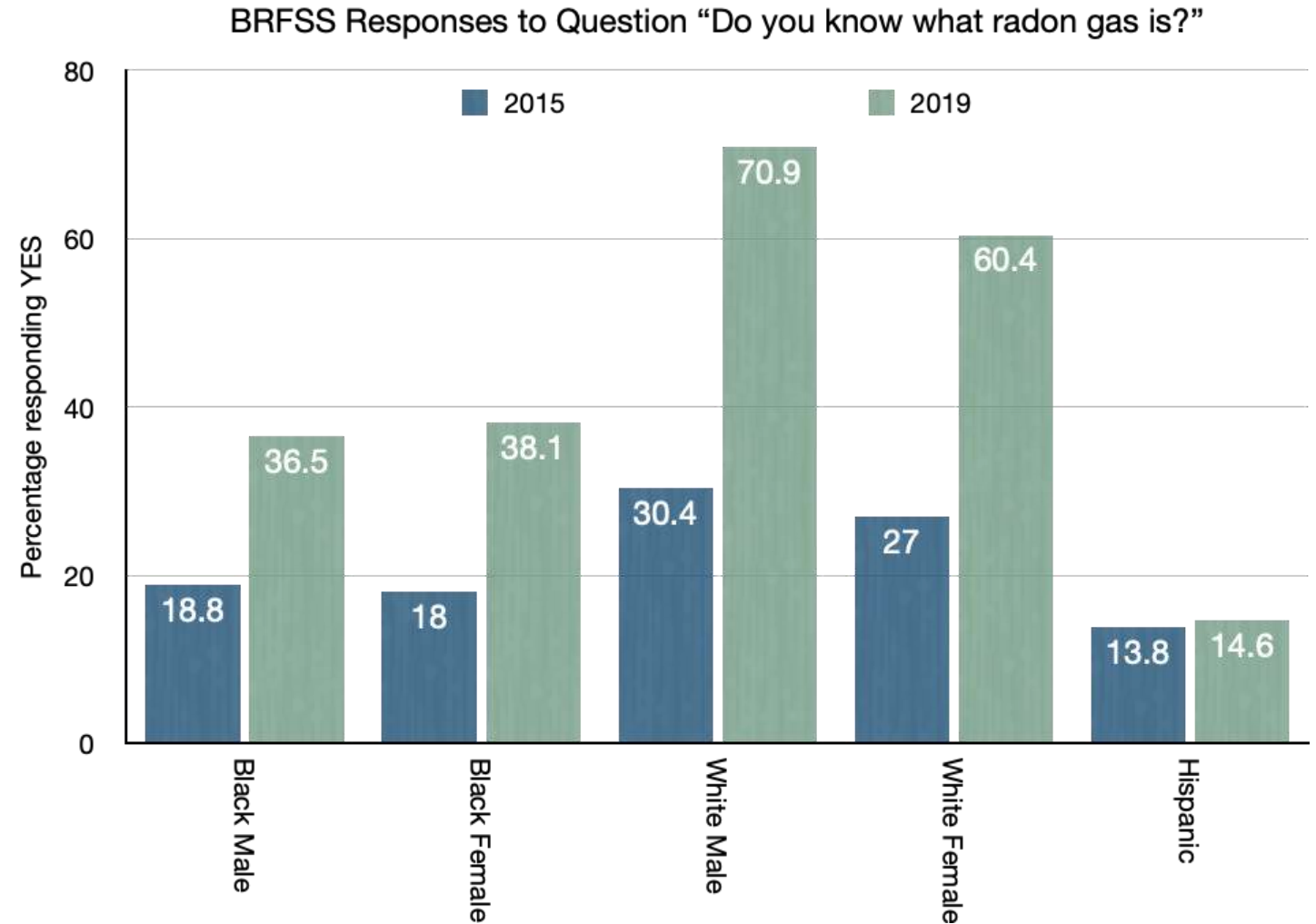
Radon is a Health Disparity

Those who make less income are more likely to not know about radon



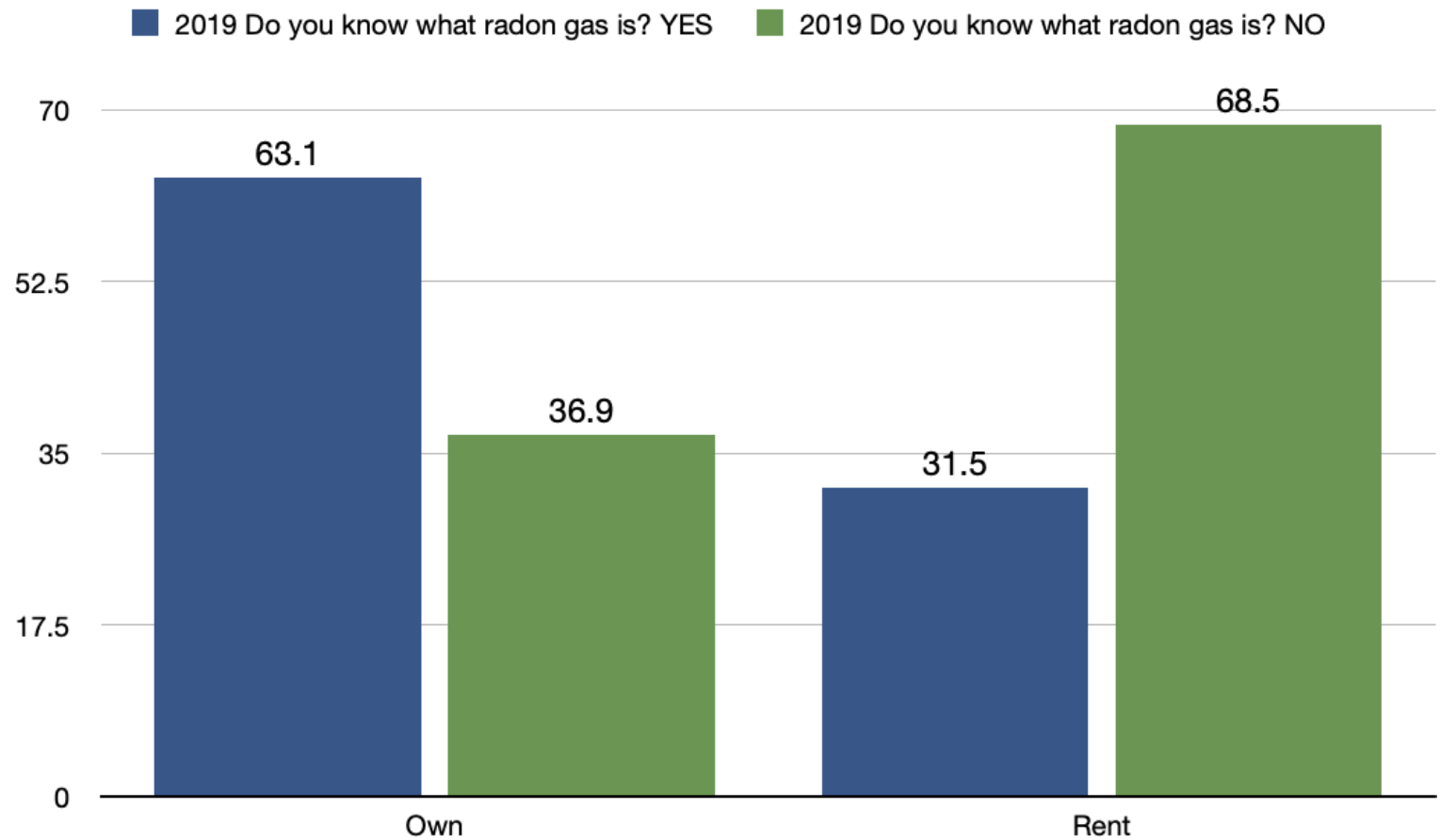
Radon is a Health Disparity

People of Color are less likely to know about radon gas



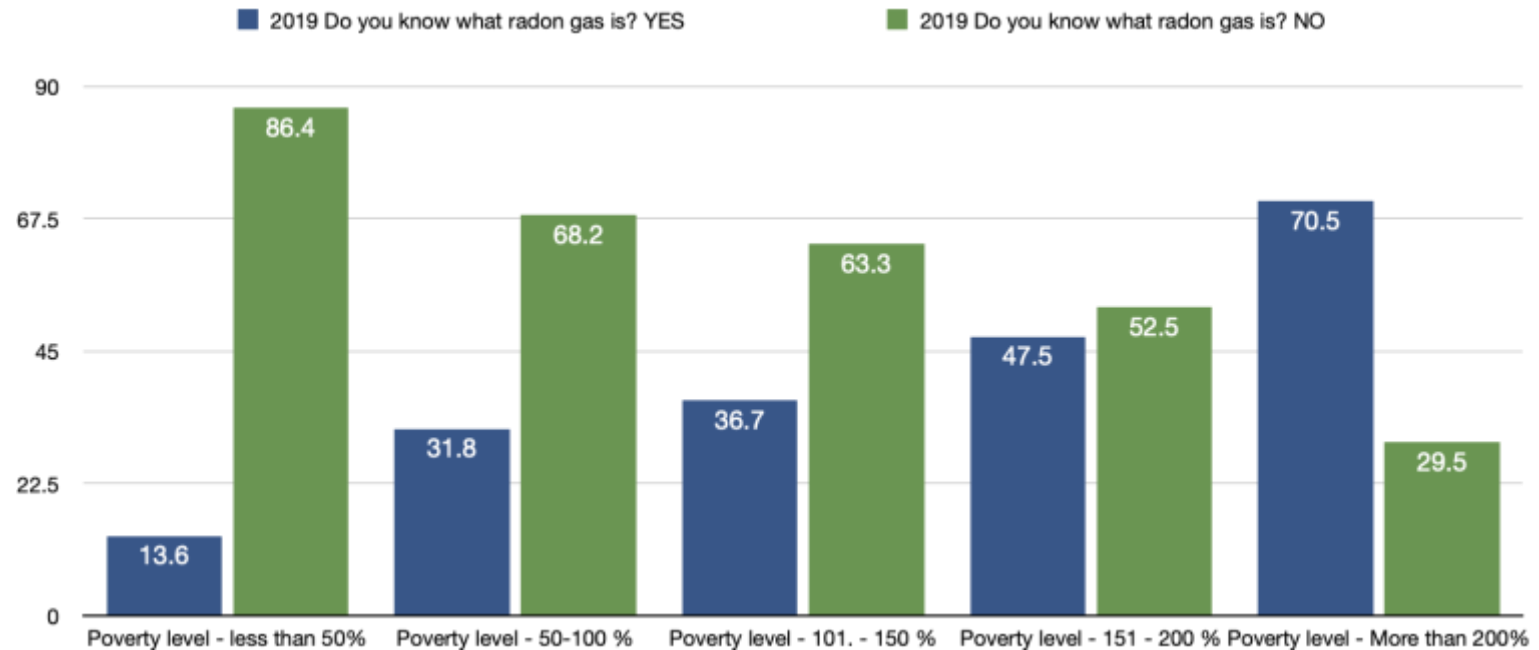
Radon is a Health Disparity

People who rent their home are less likely to know about radon gas



Radon is a Health Disparity

People in poverty are less likely to know about radon gas



Free Social Media Campaign

English & Spanish
Instagram
FaceBook
Twitter



*ENERO ES EL MES NACIONAL DE
CONCIENTIZACIÓN SOBRE EL RADÓN*

¿Qué es el radón? El radón es un gas radiactivo causante de cáncer que podría haber en tu casa. No se puede ver, oler o saborear.

El radón es la segunda causa principal de cáncer de pulmón después de fumar.

HAZ LA PRUEBA PARA EL RADÓN HOY! Radon-Lung-Cancer-Factsheet.pdf



CONCIENTIZACIÓN
SOBRE EL RADÓN

Conoce los Riesgos

Invisible, sin olor, sin sabor... y peligroso

radon.ncdhhs.gov

Adaptado de un gráfico de los CDC.



El radón es la causa #1 de cáncer de pulmón entre los no fumadores



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radon.ncdhhs.gov

Adaptado de un gráfico de los EPA.

Get Your Free Radon Test Kit

LIMITED QUANTITY!

Get a kit in person:

January 11, 2023 from 12:30 to 3 p.m.

- Dorthea Dix campus; Edgerton Building
- First floor conference room adjacent to the lobby

