

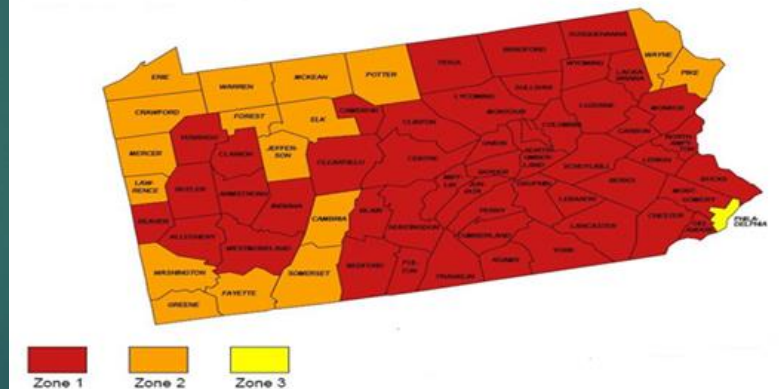
RADON INDUCED LUNG CANCER IN PA

The Invisible Risk

THAT IS EASILY IDENTIFIABLE
AND PREVENTABLE!!!

NATHANIEL L. BURDEN, JR. (RADON SCIENTIST, CONSULTANT)
CHAPTER PRESIDENT OF THE AMERICAN ASSOCIATION OF
RADON SCIENTISTS AND TECHNICIANS (AARST), MEMBER OF
CITIZENS AGAINST RADIOACTIVE RADON REDUCTION (CR3) AND
ARRST FOUNDATION

PENNSYLVANIA - EPA Map of Radon Zones



Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCi/L (picocuries 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

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

READING THE SIGNS OF RISK



Sometimes, it's the small details that count.



THE BASIC FACTS

- ▶ RADON IS NATURALLY OCCURRING IN GROUND (SOIL GAS)
- ▶ RADON IS A GAS, ODORLESS, TASTELESS, COLORLESS
- ▶ RADON IS RADIOACTIVE, ALONG WITH THE RESULTING RADON DECAY PRODUCTS
- ▶ RADON AND ITS RADON DECAY PRODUCTS (MAINLY ALPHA RADIATION)
- ▶ RADON IS FOUND IN EVERY COUNTY OF PA
- ▶ RADON IS THE NUMBER ONE CAUSE OF LUNG CANCER AMONG NON-SMOKERS
- ▶ SECOND LEADING CAUSE OF LUNG CANCER IN THE U.S.—EPA ESTIMATES 21,000 RADON INDUCED LUNG CANCERS A YEAR. 1 IN 7 LUNG CANCERS DEATHS ARE RADON RELATED
- ▶ RADON IS CLASSIFIED BY EPA AS A "CLASS A" CARCINOGEN
- ▶ RADON EPA ACTION LEVEL IS SET AT 4 PICOCURIES PER LITER
- ▶ RADON GAS IN WELL WATER IN PA IS ALSO A CONCERN
- ▶ 40% OF RADON TEST RESULTS REPORTED TO THE PA DEP ARE ABOVE 4.0 PCI/L
- ▶ OVER 6000 PA RADON TESTS OVER 100 PCI/L
- ▶ MOST RADON TESTING IS REAL ESTATE SALES TRIGGERED
- ▶ NOT JUST IN HOMES, BUT SCHOOLS, DAYCARE, SCHOOLS, HOSPITALS, AND WORKPLACES
- ▶ THERE IS NO SAFE LEVEL OF RADON GAS EXPOSURE

5 things you should know about RADON:

- It's the #1 cause of lung cancer in non-smokers in the U.S.
- It's found everywhere in Pennsylvania.
- Testing is the only way to know if your home is at risk.
- Testing is easy and inexpensive.
- 40 % of Pa. homes have radon levels above recommended safe levels.



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

For more information visit
www.dep.pa.gov/radon or call
1.800.23.RADON.

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



WHY IS RADON DANGEROUS?

Radon is responsible for

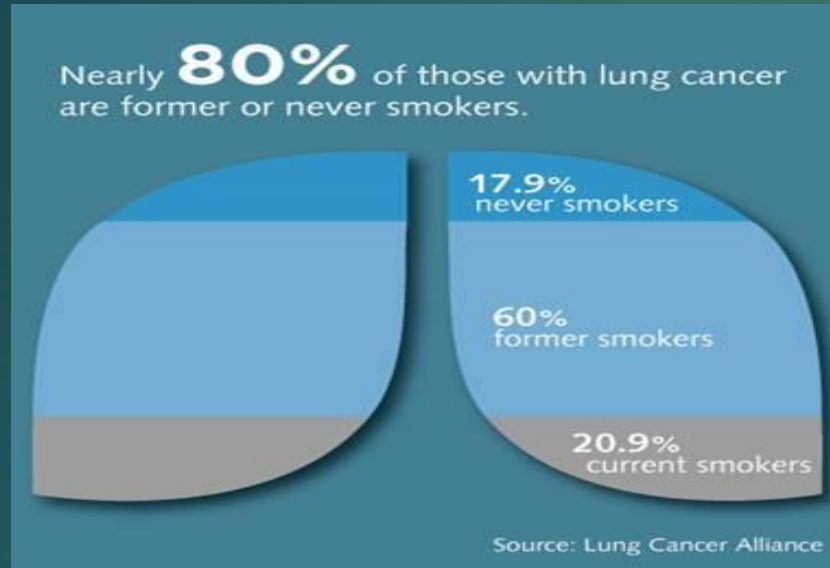
21,000

lung cancer
deaths per year

58
DEATHS
PER DAY

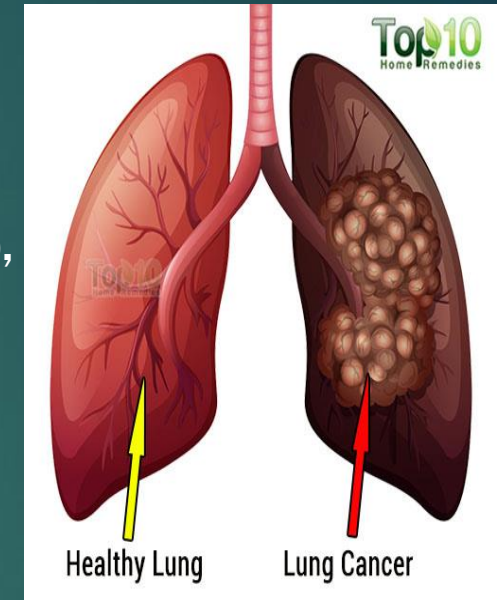


Sobering Info, but still numbers



An estimated 154,050 Americans are expected to die from lung cancer in 2018, accounting for approximately 25 percent of all cancer deaths.²

- The lung cancer five-year survival rate (18.6 percent) is lower than many other leading cancer sites, such as colorectal (64.5 percent), breast (89.6 percent) and prostate (98.2 percent).³
- The five-year survival rate for lung cancer is 56 percent for cases detected when the disease is still localized (within the lungs). However, only 16 percent of lung cancer cases are diagnosed at an early stage.
- More than half of people with lung cancer die within one year of being diagnosed.**³



<https://www.lung.org/lung-health-and-diseases/lung-disease-lookup/lung-cancer/resource-library/lung-cancer-fact-sheet.html>

5 Year Cancer Survival Rate

Type of Cancer	2005-2011
Breast	89.4%
Prostate	98.9%
Colon	64.6%
Lung	17.4%

More people die from Lung Cancer than Breast, Prostate and Colon combined. It is estimated that 25% of non-smoking women who contract lung cancer can be attributed to their exposure to radon.

Source: National Cancer Institute, 2012

EPA Risk Chart

If 1000 people are exposed over a lifetime* the number that could get lung cancer is:

Radon Level	Non-smoker	Smoker
20 pCi/L	36	260
10 pCi/L	18	150
8 pCi/L	15	120
4 pCi/L	7	62
2 pCi/L	4	32
1.3 pCi/L	2	20

* Assumes 70 years and 18 hours per day = lifetime

If you smoke and are exposed to radon, your risk of getting lung cancer is higher than a non-smoker.
(Synergistic Effect)

It's the behavior of smoking that is the concern:
STOP SMOKING!!!!!!



Stop
Smoking.

Smokers + high radon = 1 in 3



High radon only = 1 in 20



THE SURGEON GENERAL RECOMMENDS THAT EVERY HOME IN THE US BE TESTED FOR RADON.



**If radon is the second leading cause of lung cancer
And it is preventable!**

- Why have not all houses been tested in your neighborhoods, schools, daycares, hospitals, workplaces ????
- It should not be just real estate sales motivated!

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



<https://www.rd.com/health/wellness/hidden-signs-of-toxic-mold/>



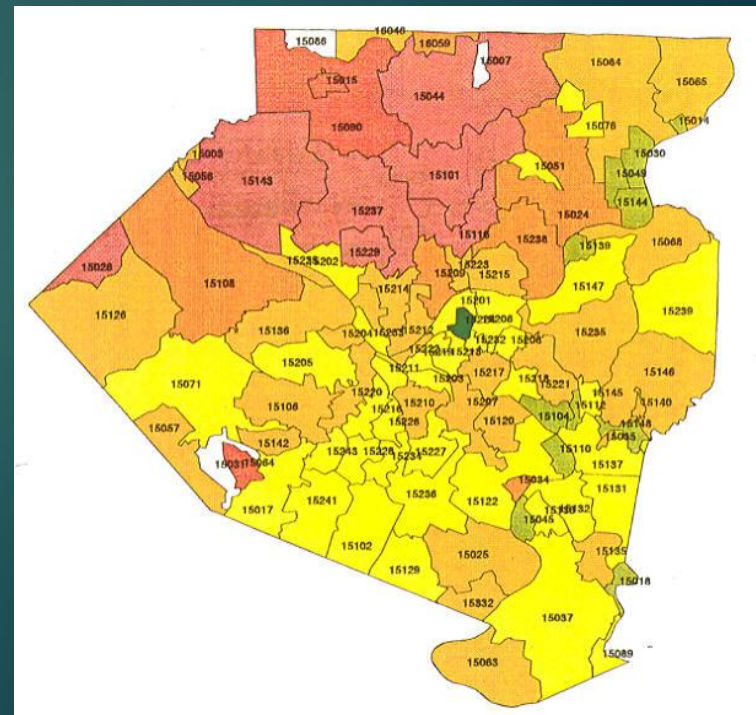
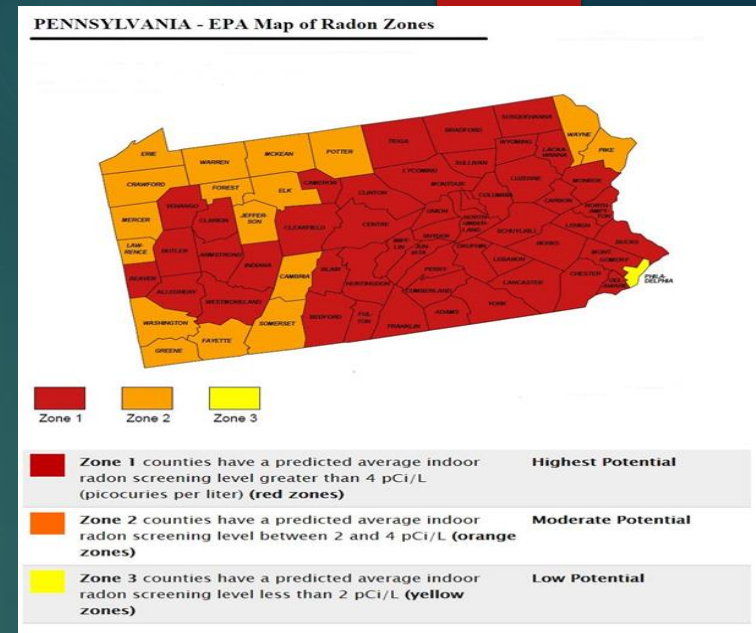
People would then test and mitigate radon gas, if it
offended the senses!

Radon does not impact the senses!

MUST MAKE THE DANGER GRAPHIC AND REAL

THE FACTS

- ▶ More than 40% of PA is considered Zone 1
- ▶ More than 85% of radon-induced lung cancer deaths are among smokers
- ▶ According to the 2016 PA Behavioral Risk Factor Surveillance System data: the Allegheny county rate for low-income residents (\$25,000) is 33%
- ▶ Among Black resident in Allegheny County, smoking rate is 32%. State average is 18%.
- ▶ Smokers are 6 times more likely to get radon-induced lung cancer than non-smokers
- ▶ **Black residents in Allegheny County (54.5%) have a higher than average lung cancer mortality rates, compared to general PA population (40.9%)**



PA DEP RADON ZIPCODE DATABASE

Where YOU Live

<http://www.depreportingservices.state.pa.us/ReportServer/Pages/ReportViewer.aspx?/Radon/RadonZip>

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
15213 ^(Oakland)	BASEMENT	679	66.3	3.7
15206 ^(Oakland)	FIRST FLOOR	134	11.2	1.9

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
15142 ^(Monroeville)	BASEMENT	2271	267.0	5.5
15142 ^(Monroeville)	FIRST FLOOR	109	19.6	2.3

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
15221 ^(Homewood)	BASEMENT	2761	126.0	4.5
15221 ^(Homewood)	FIRST FLOOR	231	51.8	2.9

Zip Code	Location	Num of Tests	Max Result pCi/L	Avg Result pCi/L
15090 ^(Wexford)	BASEMENT	8826	229.5	8.9
15090 ^(Wexford)	FIRST FLOOR	825	66.5	6.1



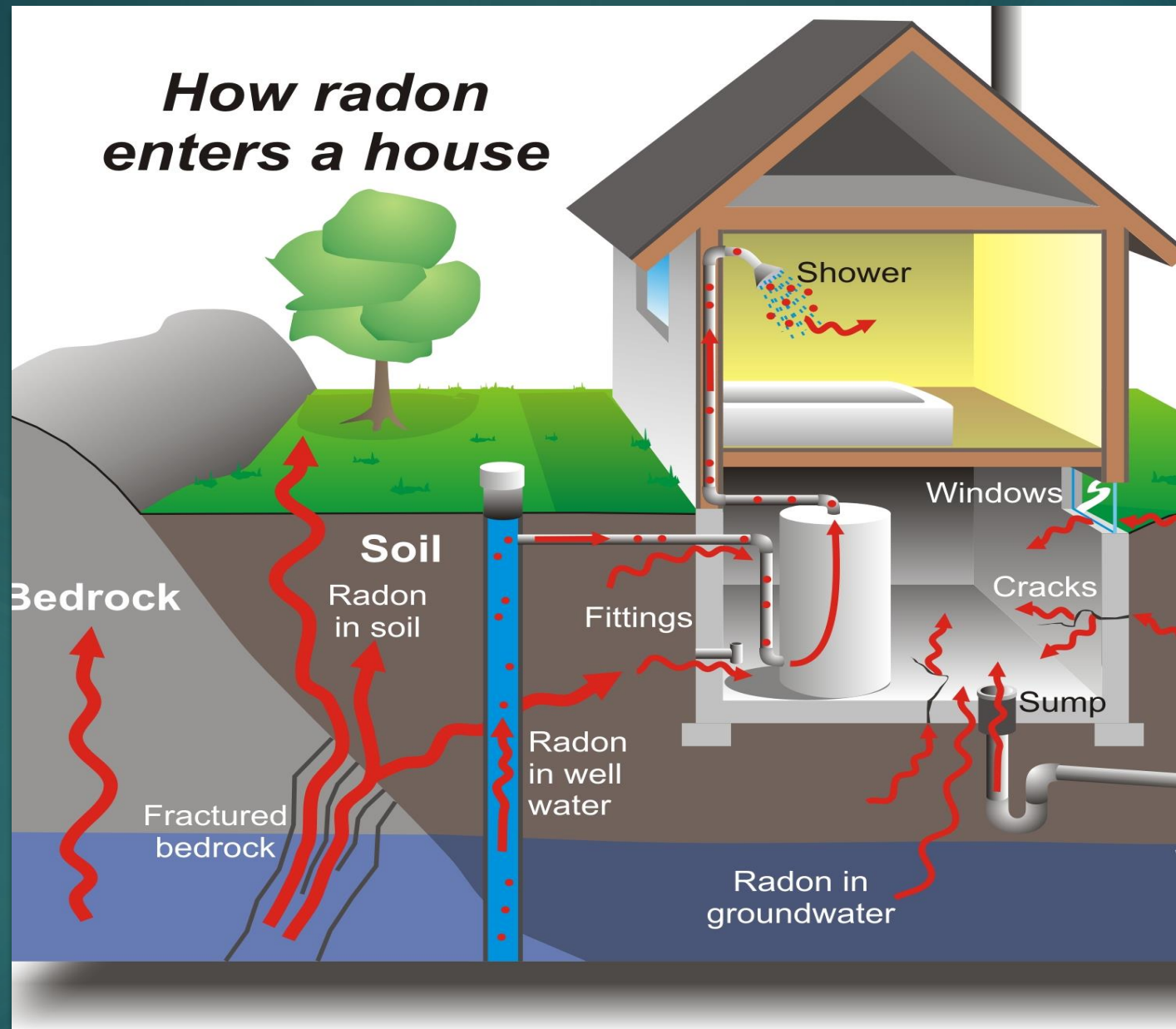
Keep in mind
that radon
levels have
been
measured in
some
communities
over 1,500
pCi/L (Center
Valley, PA)

PA has some of
the highest
radon levels
found in the
U.S.

Highest radon
level: 6,176
pCi/L in PA

Franklin Park
noted with
high radon

How radon enters a house

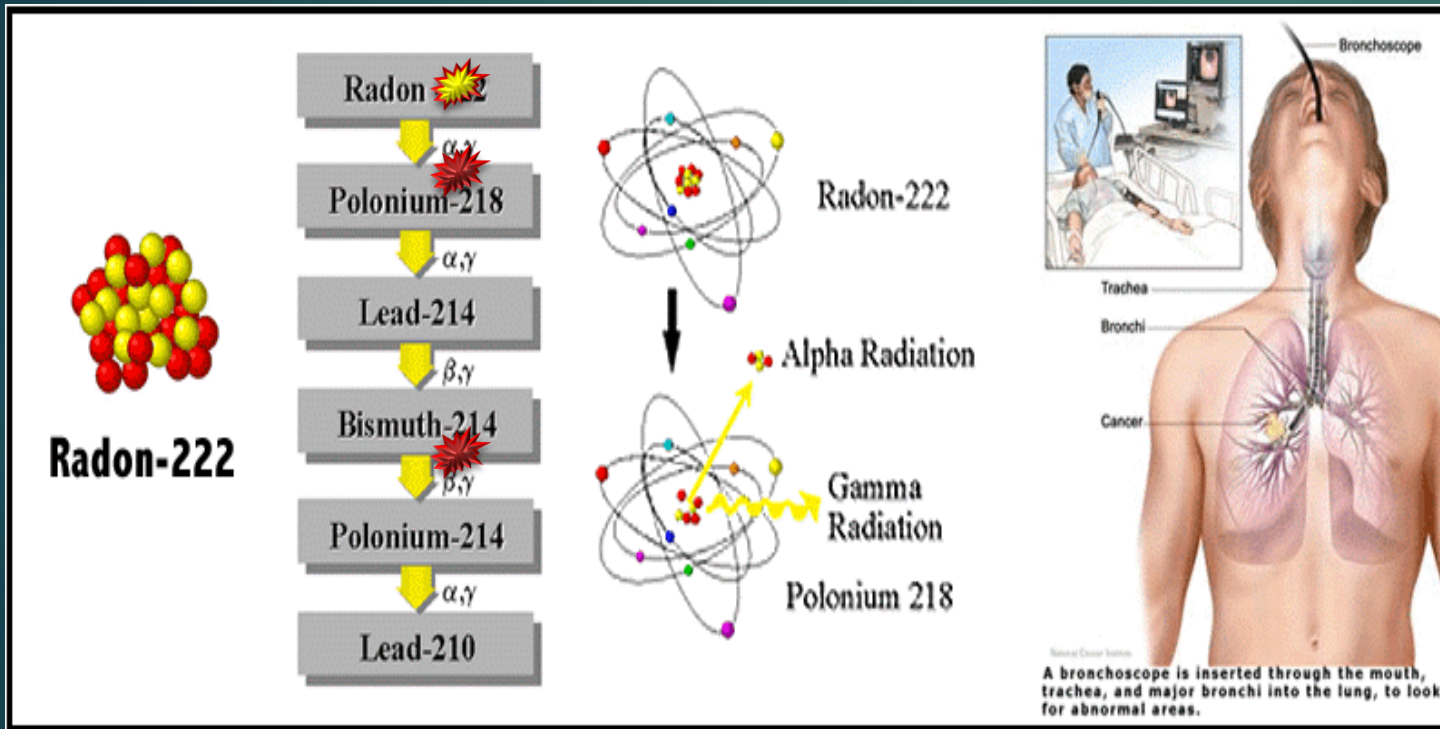


Homes are a lot of tighter.
More time spent in homes: Social Environ

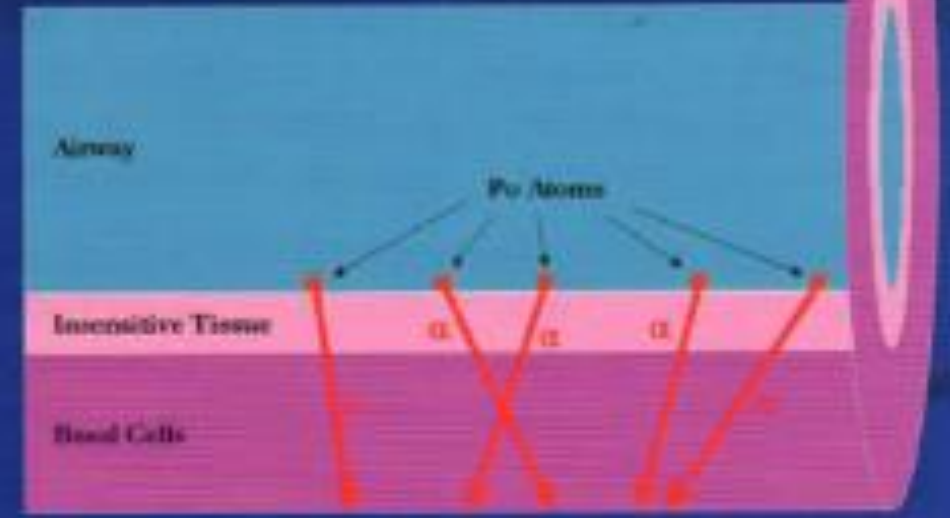


RADON DECAY PRODUCTS:

Main Source of High L.E.T. (radiation dose) and thus Ionizations delivered to the respiratory system by the mother-radon gas and RDPs.

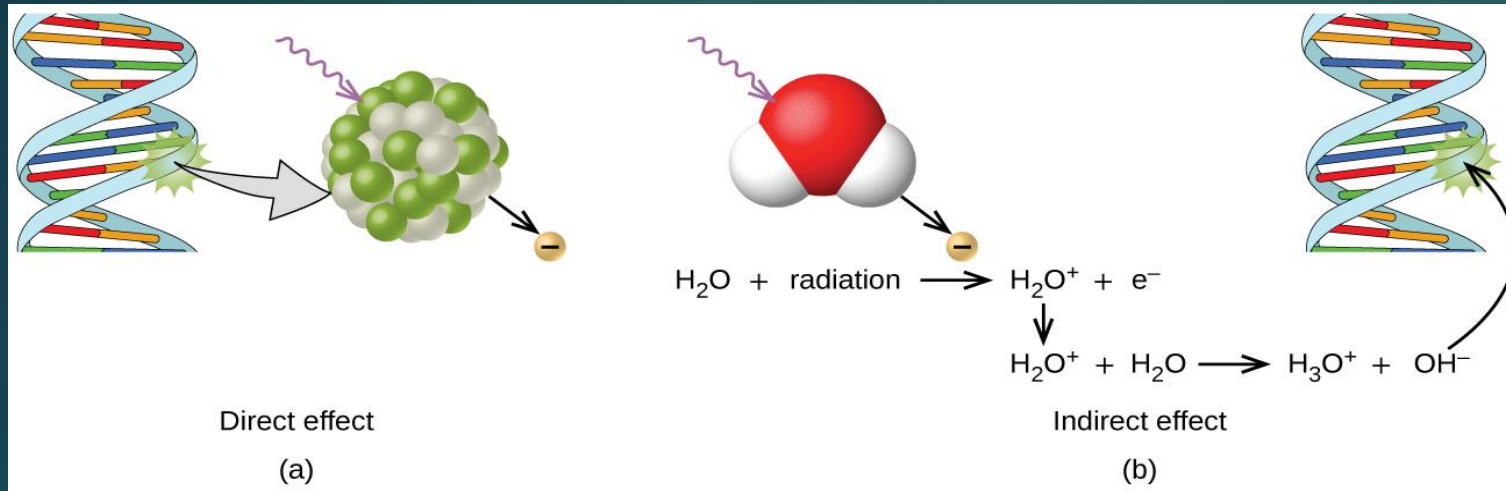


Polonium Deposited on Wall of Bronchiole Close to Sensitive Tissue

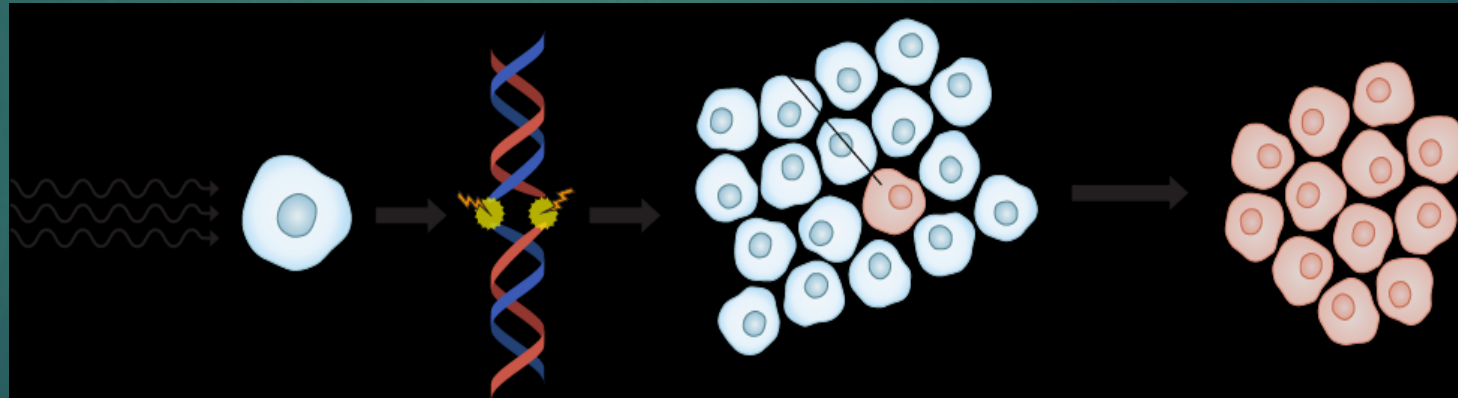


Radon Decay Products Radiation can reach directly to the respiratory system tissues

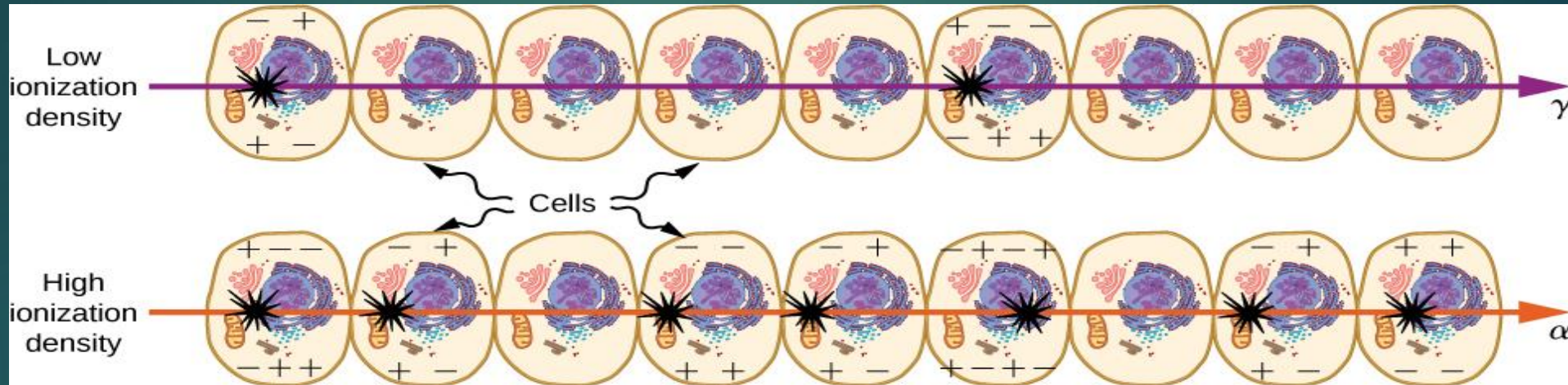
THE FORENSICS



Keep in mind that cells can repair some damage, but not all. Other factors, genetic predisposition. Long-term and accumulative damage.



THE SIGNIFICANCE OF HIGH IONIZATION ALPHA PARTICLE IMPACT TO LIVING CELLS



[https://phys.libretexts.org/Bookshelves/University_Physics/Book%3A_University_Physics_\(OpenStax\)/Map%3A_University_Physics_III_-_Optics_and_Modern_Physics_\(OpenStax\)/10%3A__Nuclear_Physics/10.7%3A_Medical_Applications_and_Biological_Effects_of_Nuclear_Radiation](https://phys.libretexts.org/Bookshelves/University_Physics/Book%3A_University_Physics_(OpenStax)/Map%3A_University_Physics_III_-_Optics_and_Modern_Physics_(OpenStax)/10%3A__Nuclear_Physics/10.7%3A_Medical_Applications_and_Biological_Effects_of_Nuclear_Radiation)

RADON IS REAL IN THE REAL WORLD, MAYBE IN YOUR HOME/WORK SITE, IN YOUR LUNGS!



MAKING THE INVISIBLE, VISIBLE. WHAT YOU CAN'T SEE, CAN HURT YOU!

TESTING IS EASY AND INEXPENSIVE
FIXING THE ELEVATED RADON CAN BE
DONE BY INSTALLING A RADON (\$20-
\$250) MITIGATION SYSTEM INSTALLED
(\$1000-\$1500) BY PA CERTIFIED RADON
MITIGATOR

THIS IS WAY CHEAPER THAN GETTING LUNG CANCER!

**THINK THAT IF WE COULD REDUCE THE RN LUNG CANCER
DEATHS TO 1/2 ?**

**THINK ABOUT THE REDUCED COST TO THE PA MEDICAL SYSTEM,
BESIDES SAVING LIVES**

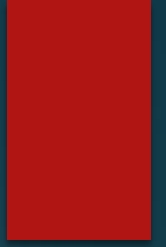
**RADON INDUCED LUNG CANCER IS PREVENTABLE IN OUR PA HOMES, SCHOOLS, DAYCARE,
HOSPITALS AND WORKPLACES**

RADON TEST DEVICES



YOU CAN EITHER USE PA CERTIFIED RADON TESTER OR BUY RADON TEST KITS ONLINE OR
IN A SPECIAL HARDWARE STORE.
HOME TEST KITS AROUND \$20-\$30

Typical RADON MITIGATION SYSTEM

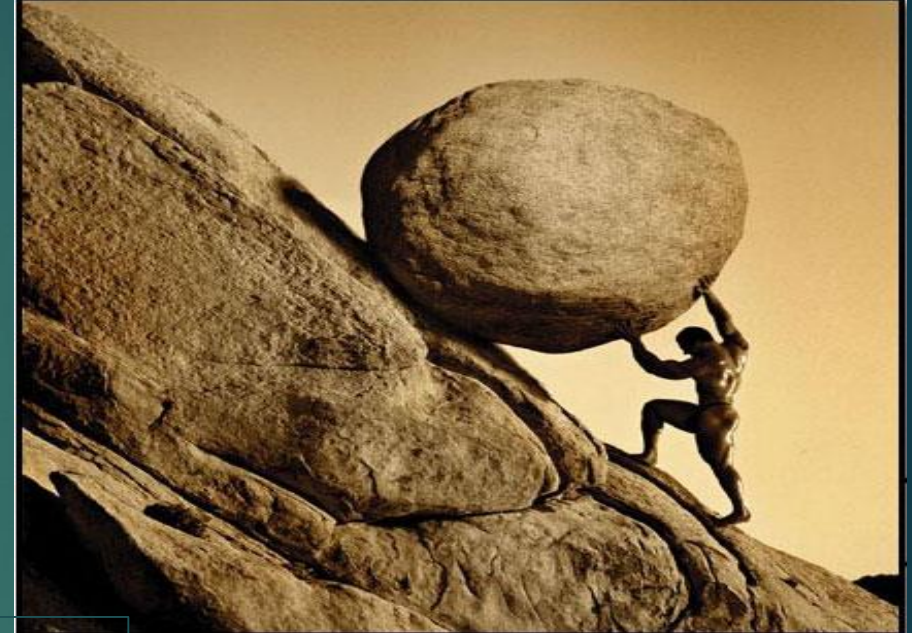


The Problem with communicating radon risk to low income and minority

The gods had condemned Sisyphus to ceaselessly rolling a rock to the top of a mountain, whence the stone would fall back of its own weight. They had thought with some reason that there is no more dreadful punishment than futile and hopeless labor.

~ Albert Camus ~

[Motivational Quotes About.com](http://MotivationalQuotes.About.com)



We can communicate radon risk to these communities, but there is no money or contractors to mitigate an elevated radon level. \$\$\$\$\$\$---
THE EXCUSE

NO EMPOWERMENT, GOOD INTENTIONS, BUT ARE WE REALLY SAVING LIVES WITH OUR PRESENT RADON RISK COMMUNICATION PROGRAM

**BOTTOM LINE IS IF WE ARE NOT MITIGATING THE HOMES, THEN WE ARE NOT SAVING LIVES!
RISK COMMUNICATION WITHOUT A BUILT-IN EMPOWERED OUTCOME**

THE SOLUTION:

- ▶ Everyone
- ▶ Not depending on government for funding.
- ▶ Not just radon testers and mitigators
- ▶ I mean everyone. Businesses, companies, non-profits, foundations, banks, utilities, hardware stores, etc.
- ▶ Brought together with passion and engagement with a focused goal/outcome.
- ▶ Goal for any low-income home identified with elevated radon, provide the means to mitigate.
- ▶ **Then you are truly saving lives with a quantified outcome.**



Pennsylvania Citizen's Guide To Radon



**The Guide To Protecting
Yourself And Your Family
From Radon**

<https://www.lung.org/local-content/pennsylvania/documents/pa-citizens-guide-to-radon.pdf>

A HEALTHY HOME

- ▶ MAKING A HOME HEALTHY IS NOT JUST TESTING AND MITIGATING RADON.
- ▶ RADON SHOULD BE ON THE RADAR OF EVERY FAMILY, EVERY PERSON, EVERY MEDICAL PROFESSIONAL, SCHOOL DISTRICT, BUILDING OWNER IN THE STATE OF PENNSYLVANIA
- ▶ RADON SHOULD BE ON YOUR RADAR IN REACHING THE GOAL OF HEALTHY HOMES, ALONG WITH LEAD-BASE PAINT, ASBESTOS, MOLD, IAQ, ALLEGENS, EXTERNAL POLLUTIONS, HOUSE SYSTEMS, WATER, TOXIC CHEMICALS, ETC.
- ▶ A TOTAL INCLUSIVE HOLISTIC APPROACH WITH A QUANTIFIED QUALITY OF LIFE OUTCOME FOR PENNSYLVANIANS
- ▶ **BOTTOMLINE: ADDRESSING RADON SHOULD BE PART OF ANY HEALTHY HOME PROGRAM IN PENNSYLVANIA**

