



Commonwealth of Massachusetts
Department of Public Health

Helping People Lead Healthy Lives In Healthy Communities

Introduction to Radon

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Massachusetts Department of Public Health

Indoor Air Quality Program

Bureau of Environmental Health

Agenda

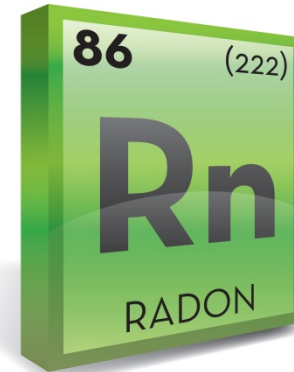
- Background
 - About radon
 - Health risks associated with exposure
 - Radon in Massachusetts
- Reducing risks from exposure
 - Testing procedures
 - Radon Resources



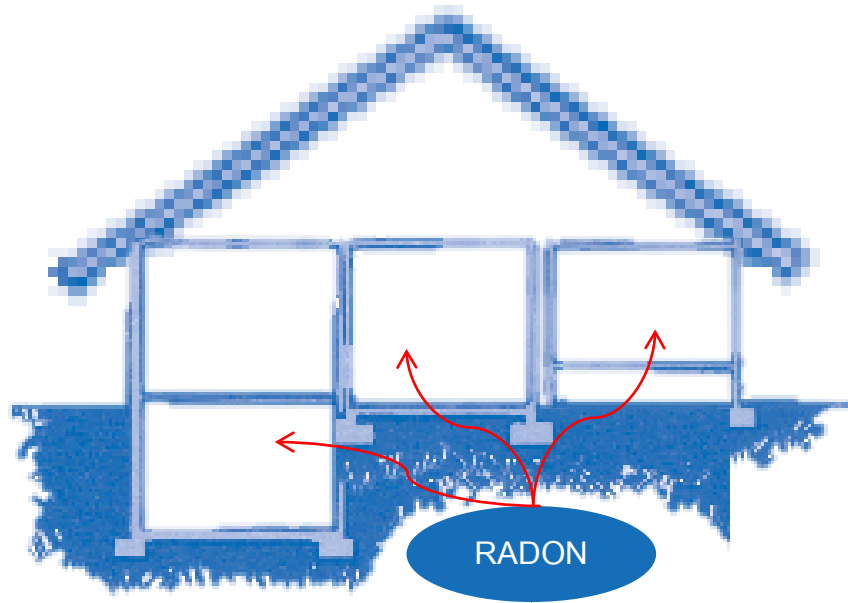
About Radon

Radon is a gas that is:

- Tasteless
- Odorless
- Colorless
- Naturally occurring
- Radioactive



About Radon



Average outdoor air radon concentrations are 0.4 pCi/L

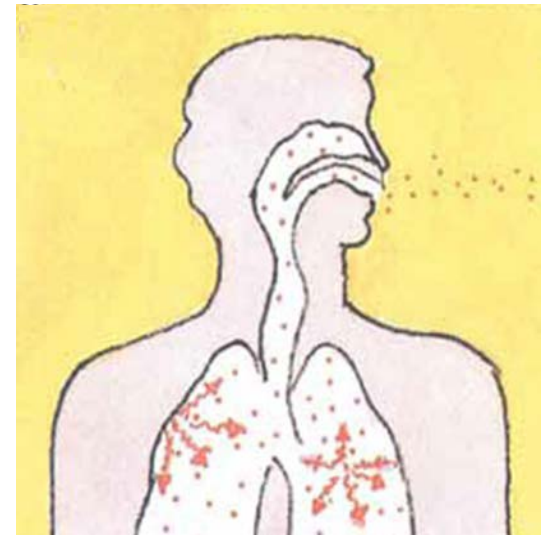
RADIUM

URANIUM



Health Risks from Radon Exposure

- Radon decay particles can enter and become trapped in your lungs when you breathe
- Risks from radon exposure depend on two factors:
 - How much
 - How long



Source: EPA, 2012

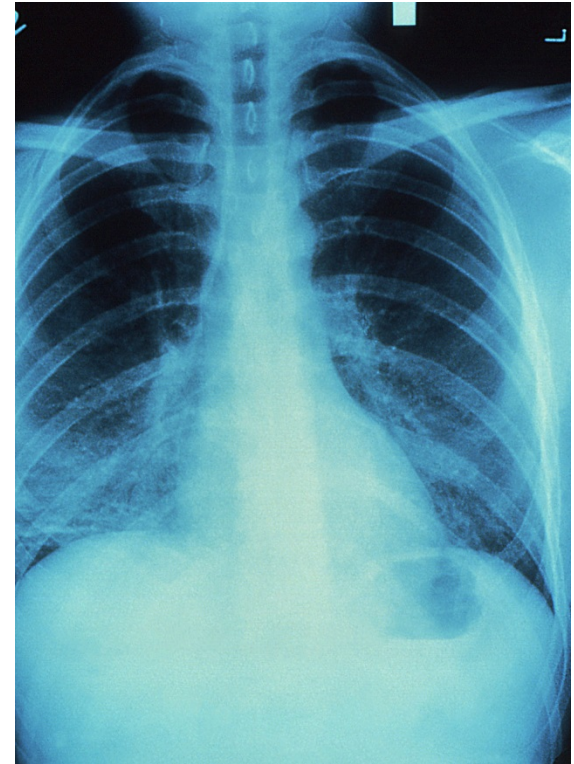


Health Risks from Radon Exposure

Radon is a known carcinogen and can increase your risk of lung cancer

It is the **#1** cause of lung cancer for never smokers

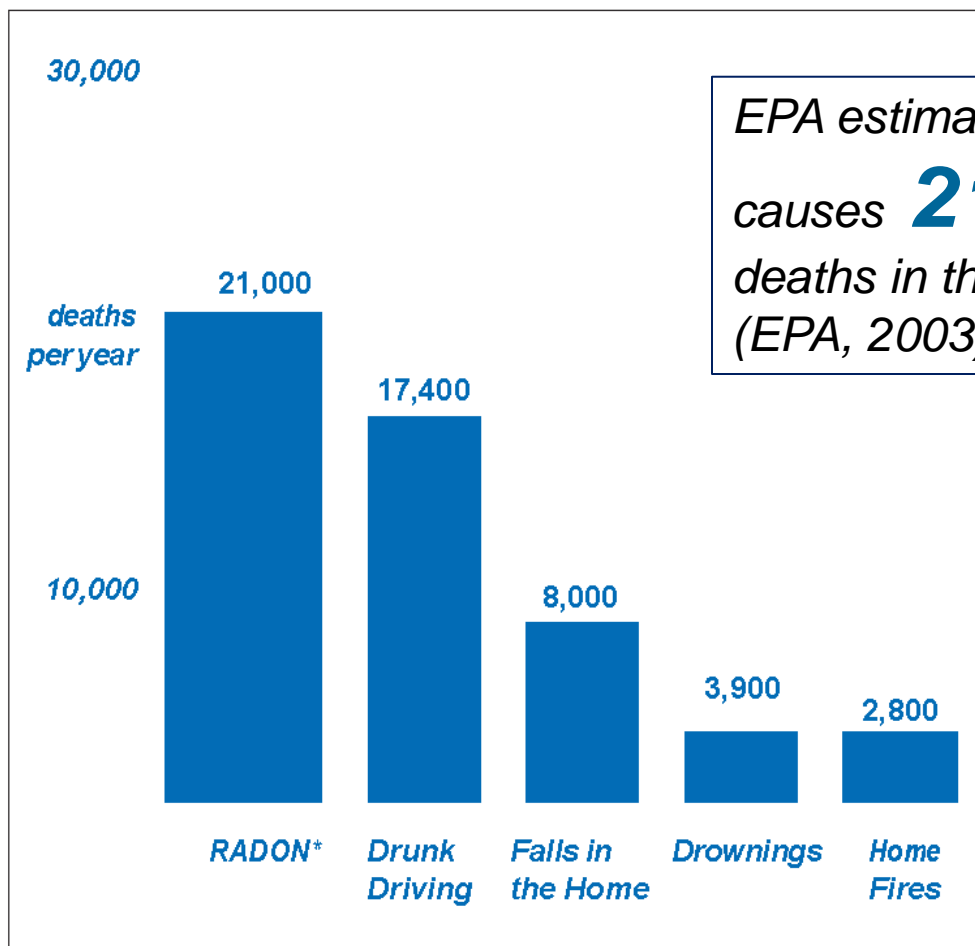
It is the **#2** cause of lung cancer overall



Source: freestockphotos.biz



Health Risks from Radon Exposure



EPA estimates that radon causes **21,000** cancer deaths in the U.S. each year (EPA, 2003).

Source: EPA, 2012



Health Risks from Radon Exposure

Lifetime Risk of Lung Cancer Death from Radon Exposure in Homes			
Risk is Shown per 100,000 people			
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

* "Never Smoker" refers to an individual who has smoked fewer than 100 cigarettes in his or her lifetime

Source: Conference of Radiation Control Program Directors, 2017



Action and Mitigation Levels for Radon in Indoor Air

EPA Action Level:

2 - 4 pCi/L

Target Radon Level

Less than 2 pCi/L

pCi/L = picocuries per liter



Radon in Massachusetts

Number of homes with radon levels above **4 pCi/L**:

650,000 homes*

Number of homes with radon levels above **20 pCi/L**:

34,000 homes*

Highest radon level measured in a building:

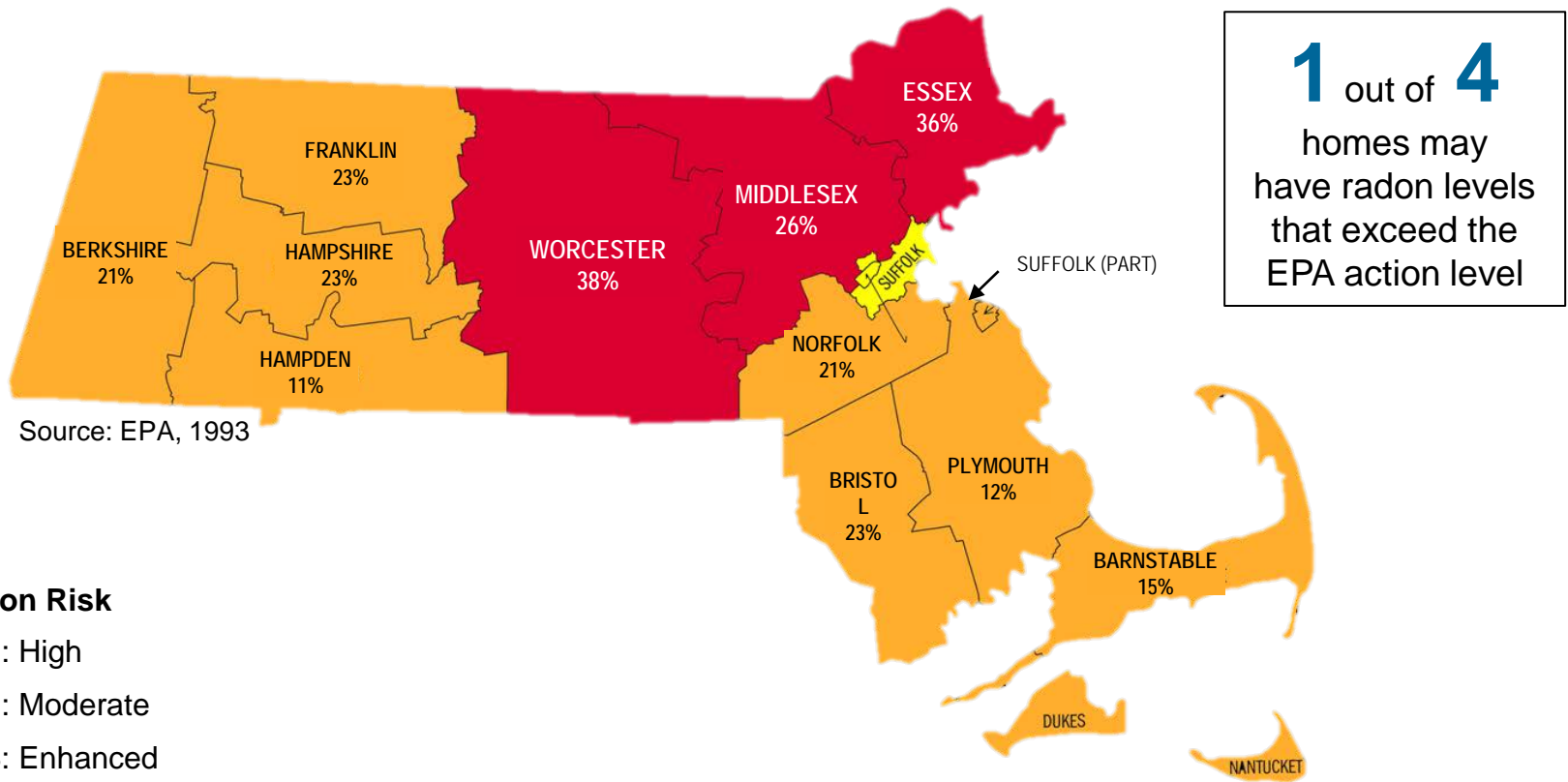
1,981 pCi/L

*EPA estimates (EPA,)



Radon in Massachusetts

Distribution of homes with radon concentrations greater than or equal to 4 pCi/L and relative radon risk by county

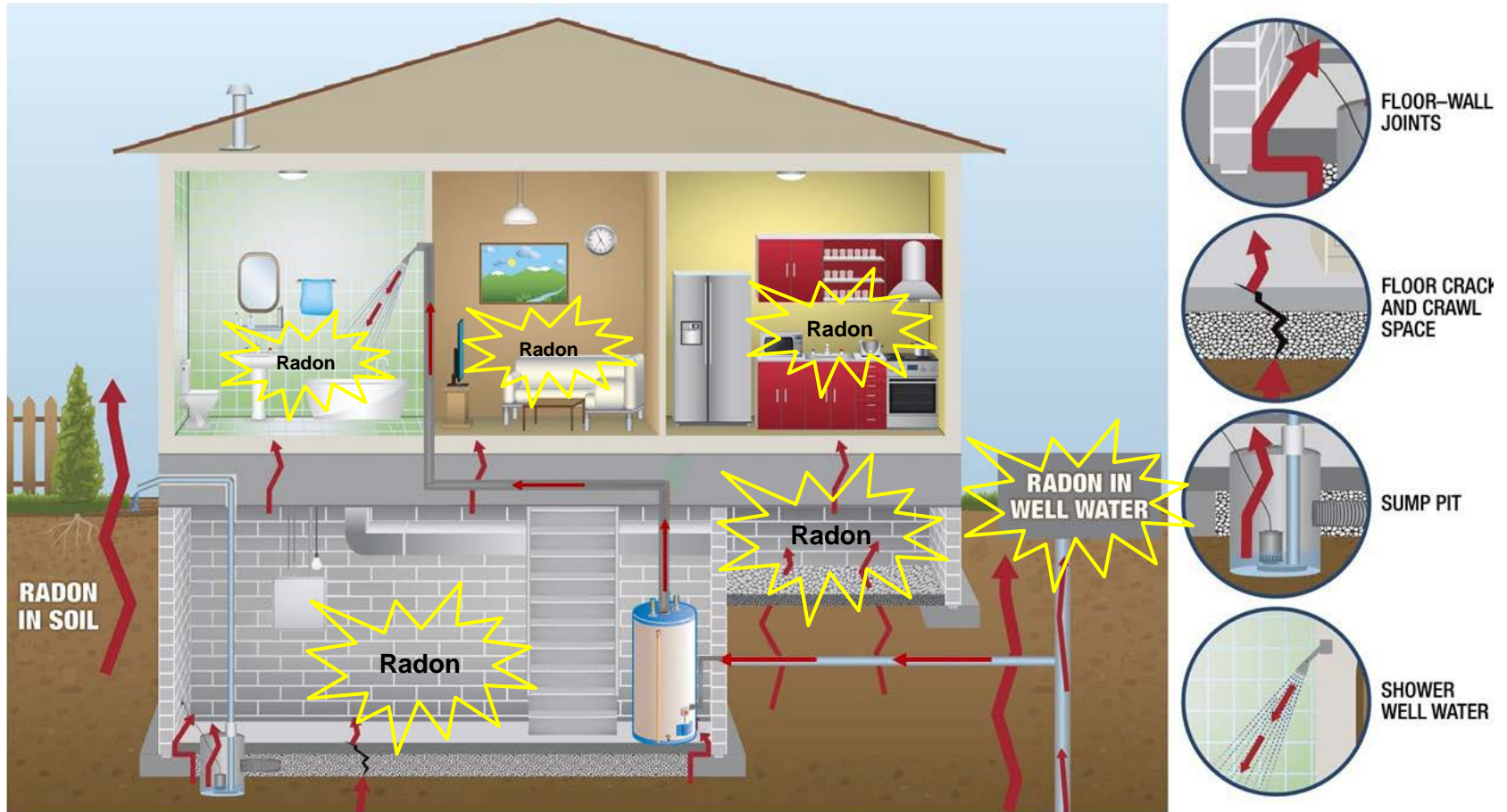


Relative Radon Risk

- Zone 1: High
- Zone 2: Moderate
- Zone 3: Enhanced



Radon Sources in a Home



Source: CRCPD, 2017



Radon Air Testing

Should I test my home?

- Any home that touches the ground should be tested
- A neighbor's radon levels will not predict your radon levels
- Contact the MDPH Radon Unit for a test kit

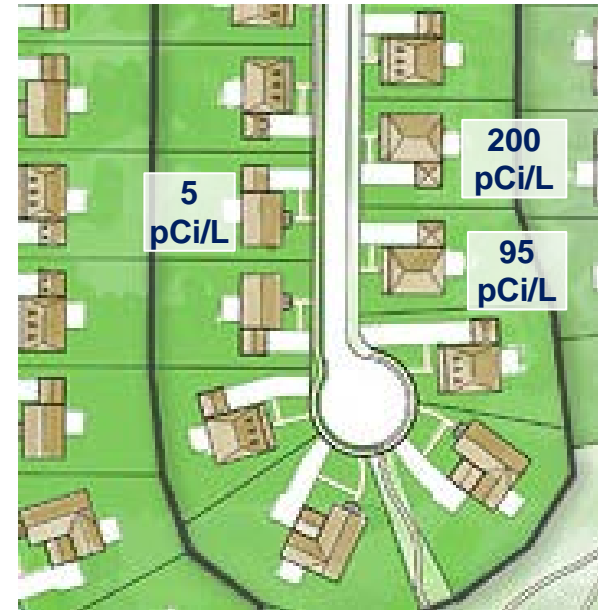
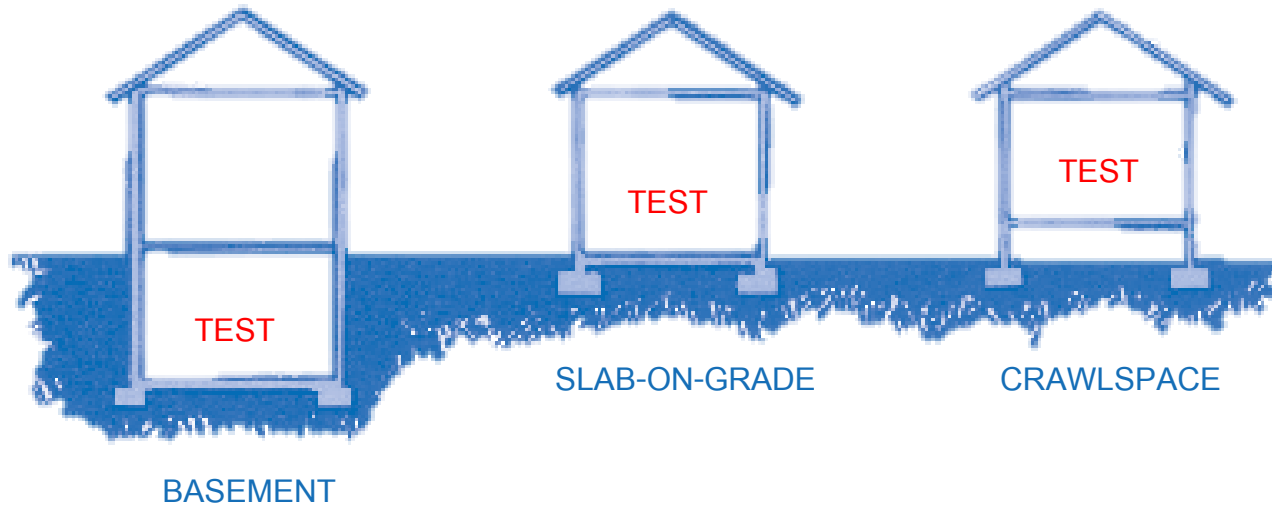


Image source: bing.com



Radon Air Testing

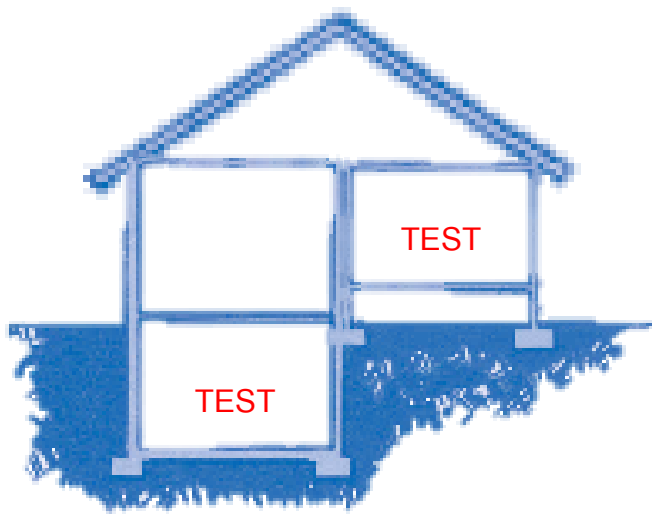


Place tests in lowest livable level

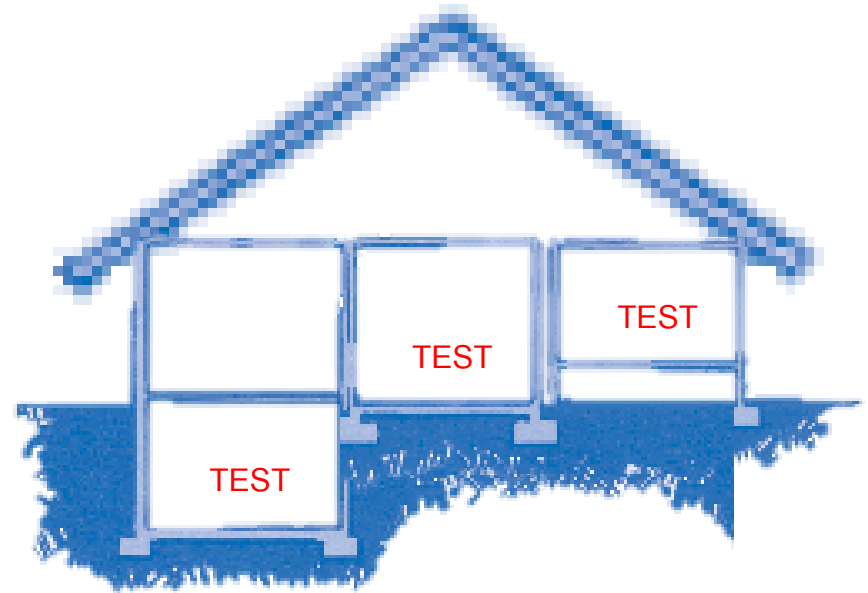
- Basement (whether used for living or storage)
- Room on slab
- Room above crawl space



Radon Air Testing



BASEMENT + CRAWLSPACE



BASEMENT + SLAB-ON-GRADE + CRAWLSPACE

Place tests in lowest livable level in dwellings
with multiple types of foundations



Radon Mitigation

What to look for in a radon mitigation specialist:

- ✓ Certified by AARST-NRPP or NRSB
 - ✓ www.aarst-nrpp.com/wp/
 - ✓ www.nrsb.org
- ✓ Warranty to bring house below 2 pCi/L
- ✓ Conducts home visit



Radon Mitigation



Example of a typical radon mitigation system

- Outside of the occupied space
- Properly insulated
- Proper signage
- Has pressure gauge



Resources

- Radon Fact Sheets
 - English
 - Spanish
 - Portuguese
 - Chinese
 - Vietnamese

- Radon Standards



Questions

