Radon exposure:
Interior Region of BC

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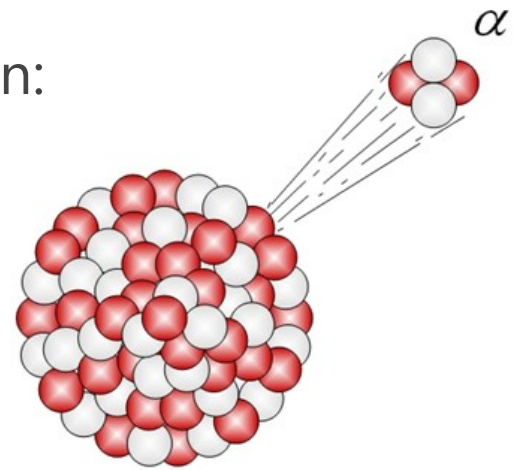
What is radon?

- Invisible, ordourless, colourless **radioactive** gas
- Natural decay product of uranium in rocks and soil
  - Canada is a uranium rich country
- **Gas phase (important for mobility through soil)**
- Radon breaks down:
  - Particles
  - Radiation

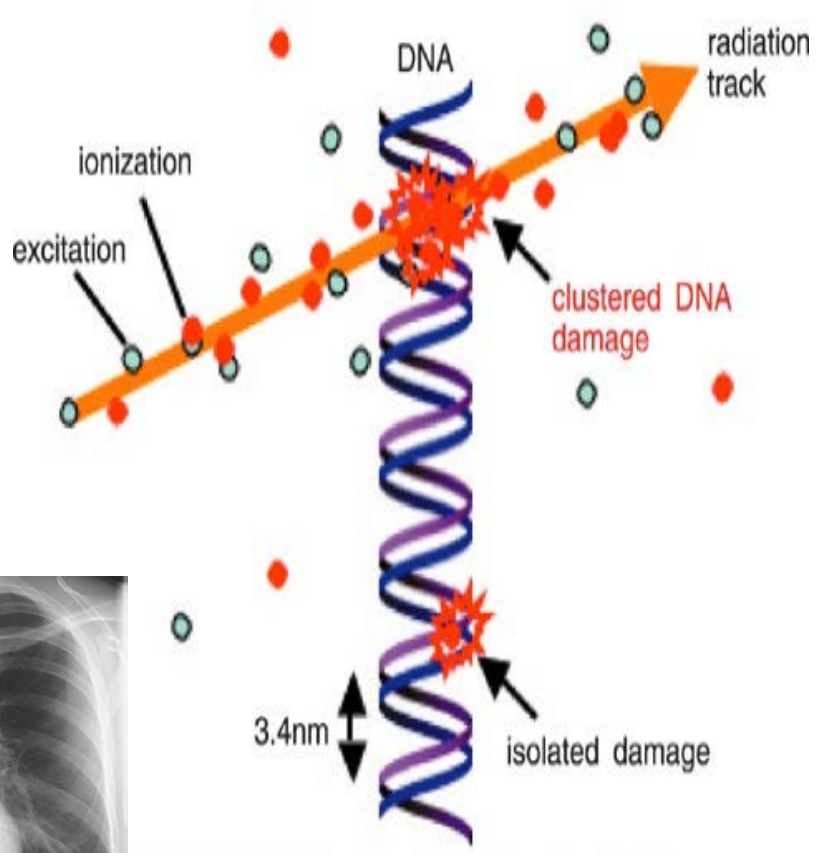


URANIUM 238 (U238) RADIOACTIVE DECAY

type of radiation	nuclide	half-life
	uranium—238	4.5×10^{9} years
α	thorium—234	24.5 days
β	protactinium—234	1.14 minutes
β	uranium—234	2.33×10^{5} years
α	thorium—230	8.3×10^{4} years
α	radium—226	1590 years
α	radon—222	3.825 days
α	polonium—218	3.05 minutes
α	lead—214	26.8 minutes
β	bismuth—214	19.7 minutes
β	polonium—214	1.5×10^{-4} seconds
α	lead—210	22 years
β	bismuth—210	5 days
β	polonium—210	140 days
α	lead—206	stable

Radiation and DNA damage

- Alpha radiation is powerful, but over a short distance
- In the lung and respiratory track, the alpha radiation "rips through" DNA bonds
- This type of clustered damage is more difficult to repair properly than other forms of DNA damage



↑ DNA damage = ↑error = genetic mutation = cancer

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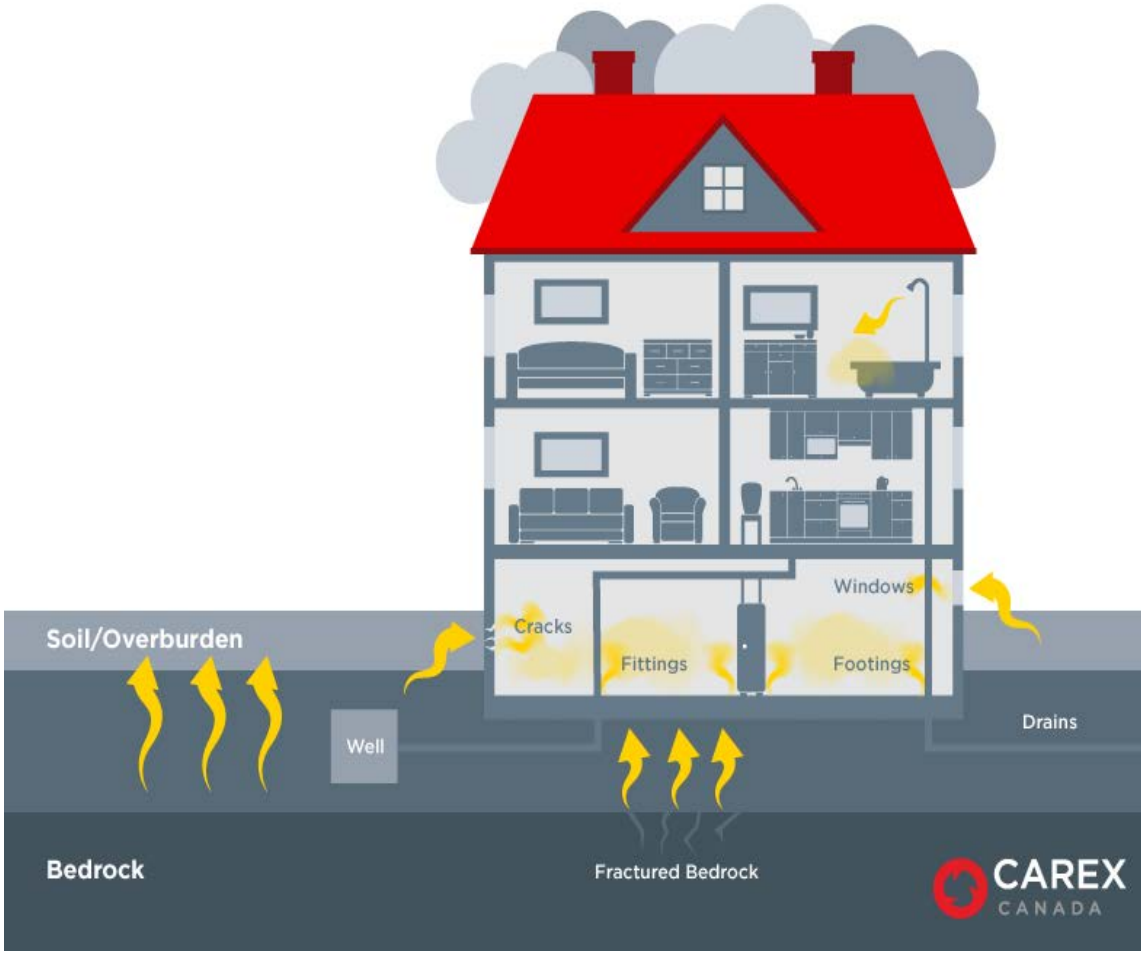
Radon can cause lung cancer

- Radon is the leading cause of lung cancer in non-smokers
- Radon is the 2nd leading cause of lung cancer in Canada (16%)
- Lung cancer is one of the most commonly diagnosed cancer (28,600 new cases in 2017)
- Lung cancer is the leading cause of cancer death in Canada
  - Health Canada estimates radon causes 3,200 lung cancer deaths

How are people exposed to radon?

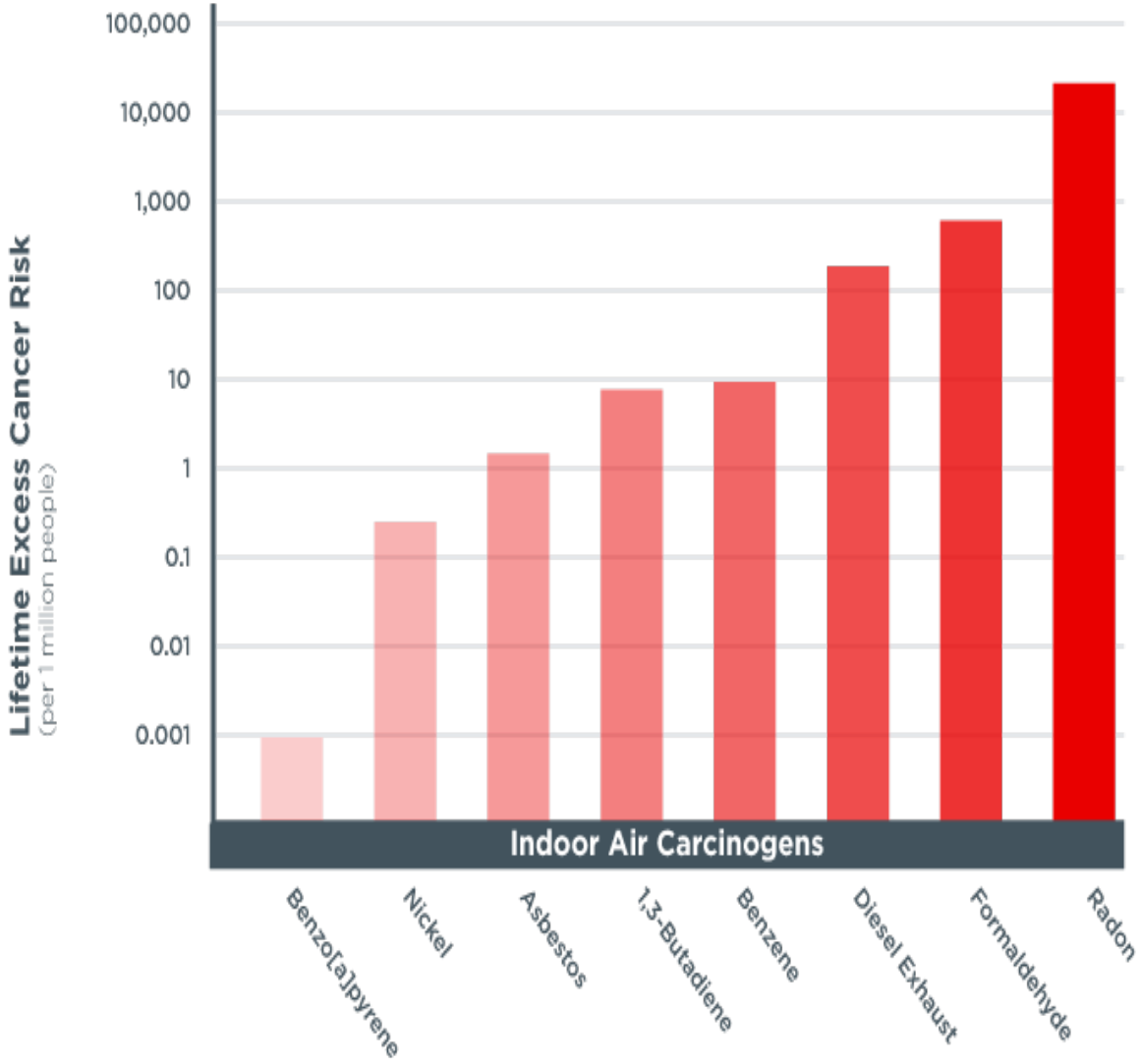
- Radon can easily move through soil and enter buildings through cracks and openings in the building's foundation
- It is drawn into buildings through pressure differential between the ground and indoors
- Once inside radon can build up to dangerous levels



CAREX Indoor Air Exposure Assessment

Radon identified as the highest priority exposure for cancer prevention

Excess of ~12,000 cancer cases per million exposed over a lifetime



CAREX Canada risk estimates for indoor air carcinogens show that radon gas is the highest priority exposure in Canadian settings.

Setton E, *et al.* "Risk-based indicators of Canadians' exposures to environmental carcinogens." *Environ Health* 2013;12(1):15.

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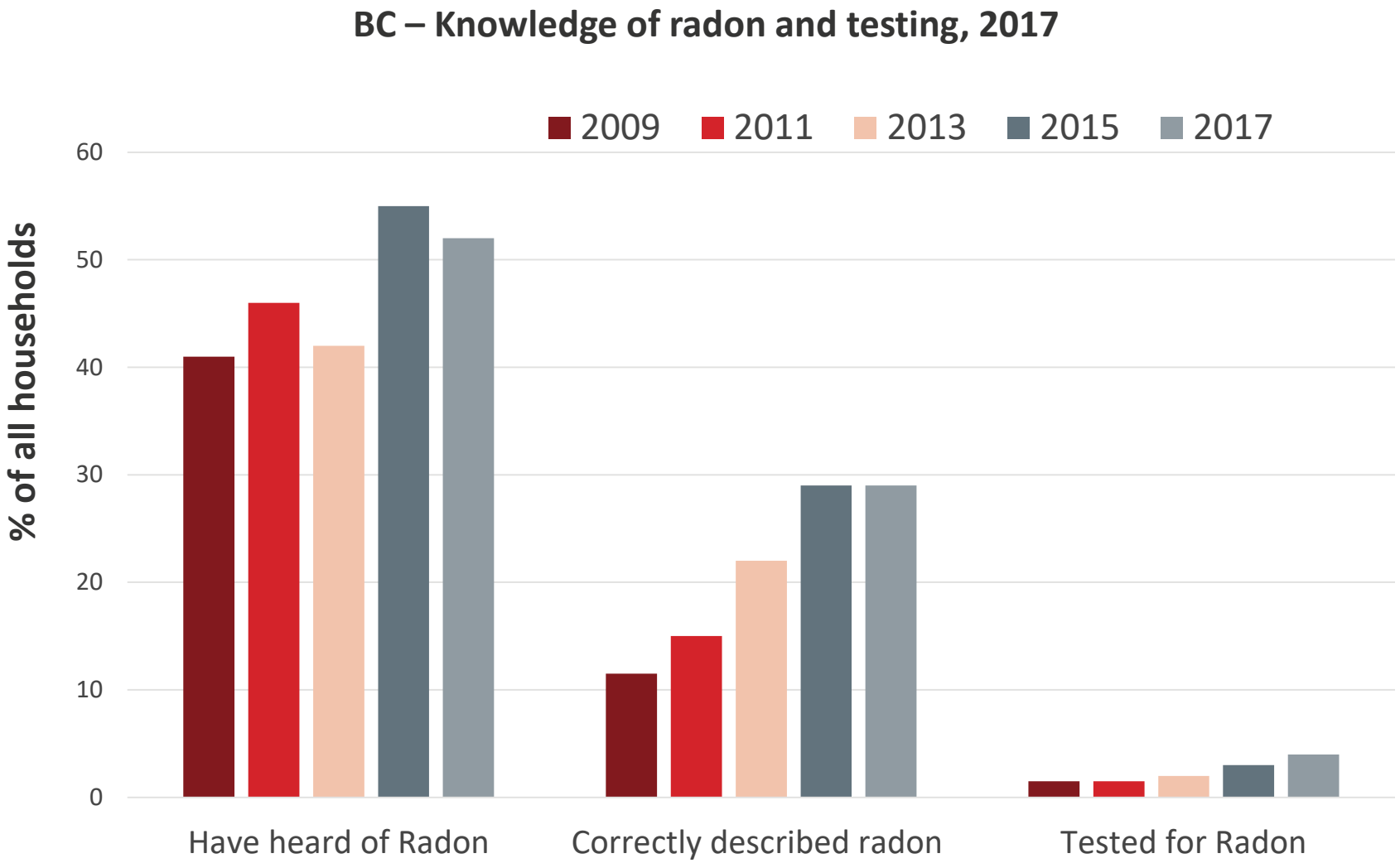
Households and Environment Survey (HES) – Statistics Canada



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Federal radon guidelines

Revised guideline introduced in 2007:

"Remedial measures should be undertaken in a dwelling whenever the average annual radon concentration exceeds 200 Bq/m^3 in the normal occupancy area"

- "dwelling" = homes, buildings with a high public occupancy rate, such as schools, hospitals, long-term care residences, and correctional facilities
- Normal occupancy = occupied for greater than 4 hours per day

200 - 600 Bq/m^3
fix your home
within 2 years

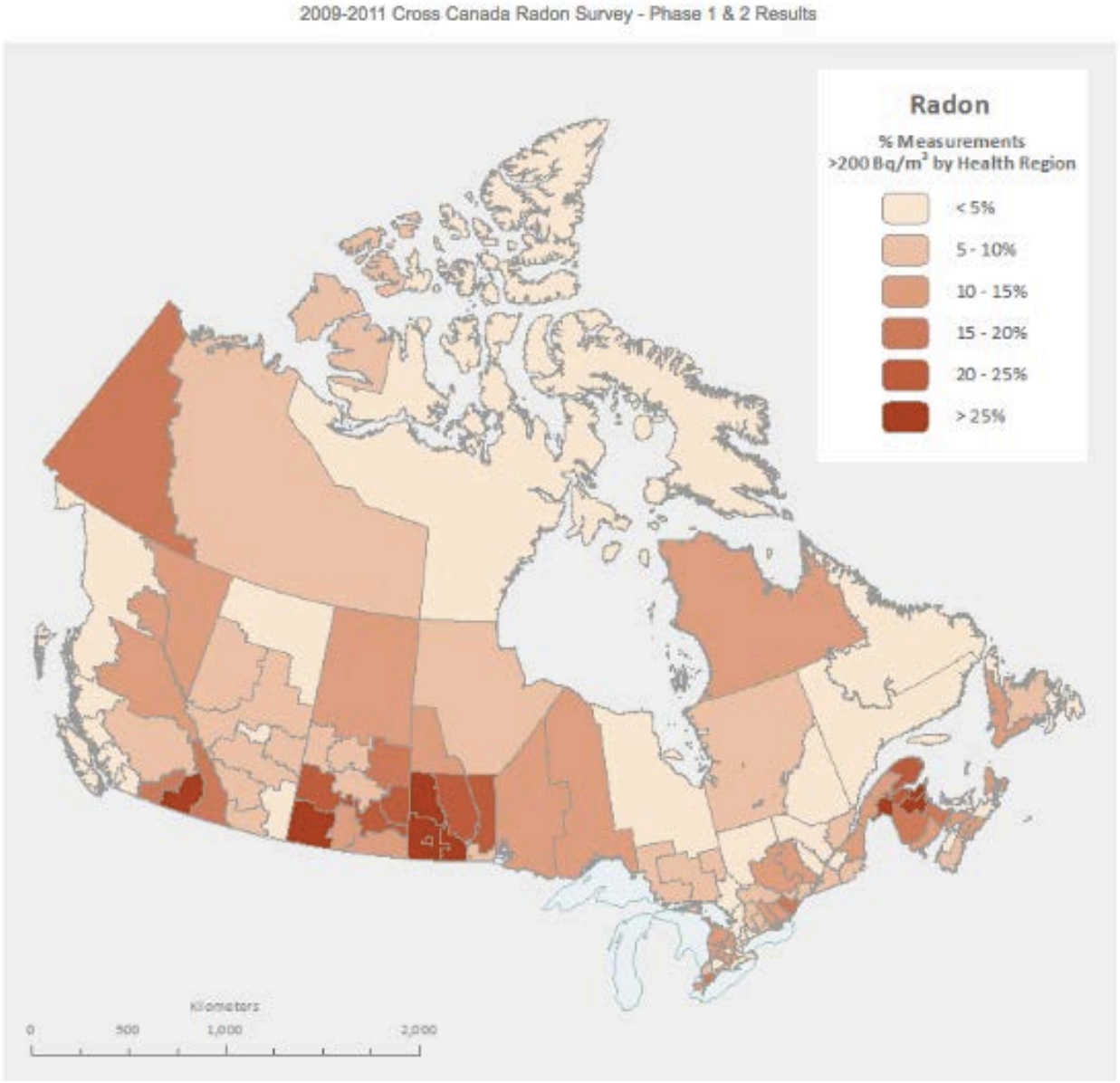
Above 600 Bq/m^3
fix your home
within 1 year

Radon levels in homes varies across the country

Percent of Measurements Above 200 Bq/m^3 by Health Region

The survey revealed that:

- 6.9% of homes tested had indoor radon levels above the Canadian guideline 200 Bq/m^3
- Most prevalent in Saskatchewan, Manitoba, New Brunswick & the Yukon



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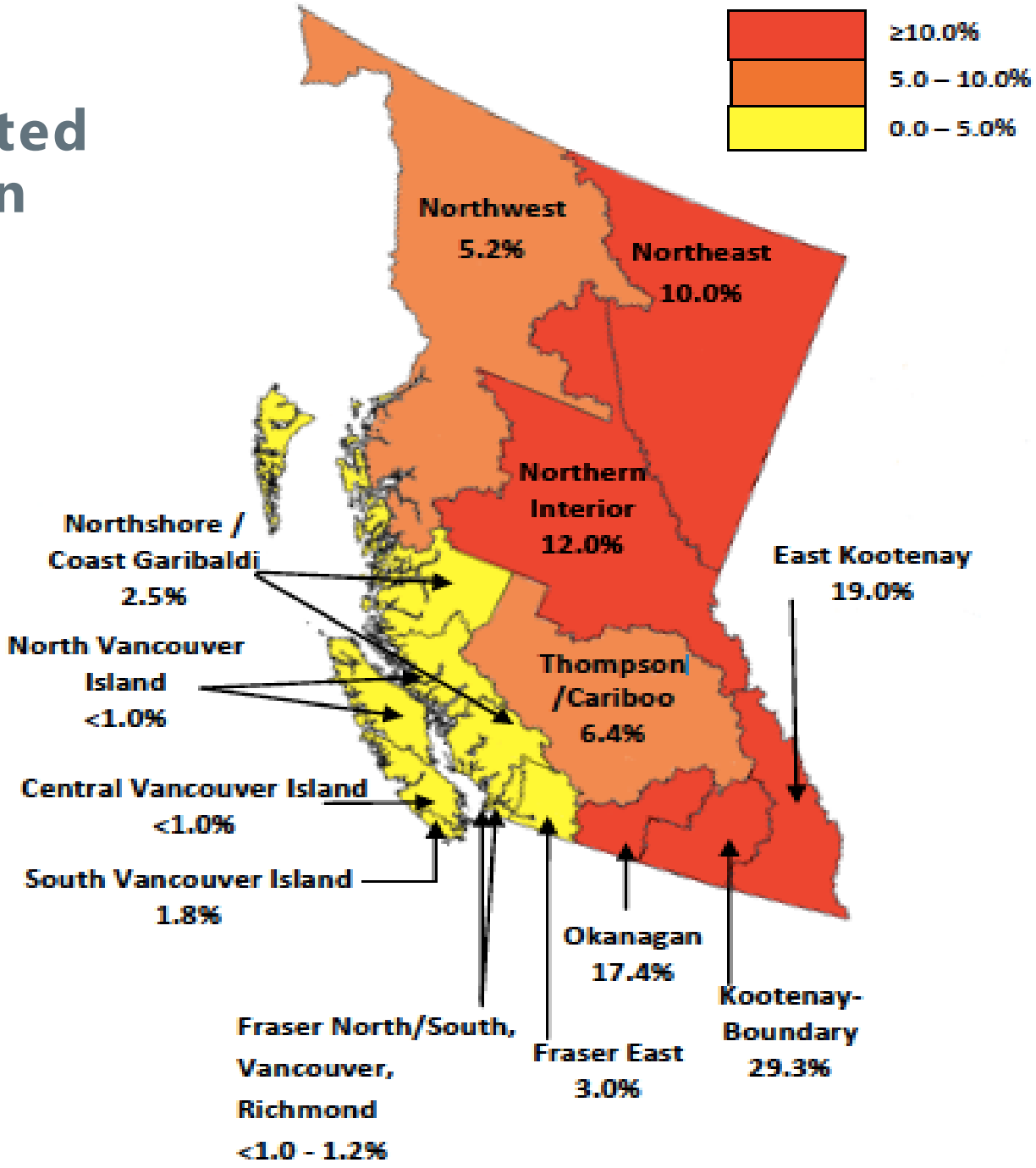
Homes that tested above the radon guideline in BC

Percent of Measurements Above 200 Bq/m^3

The survey revealed that:

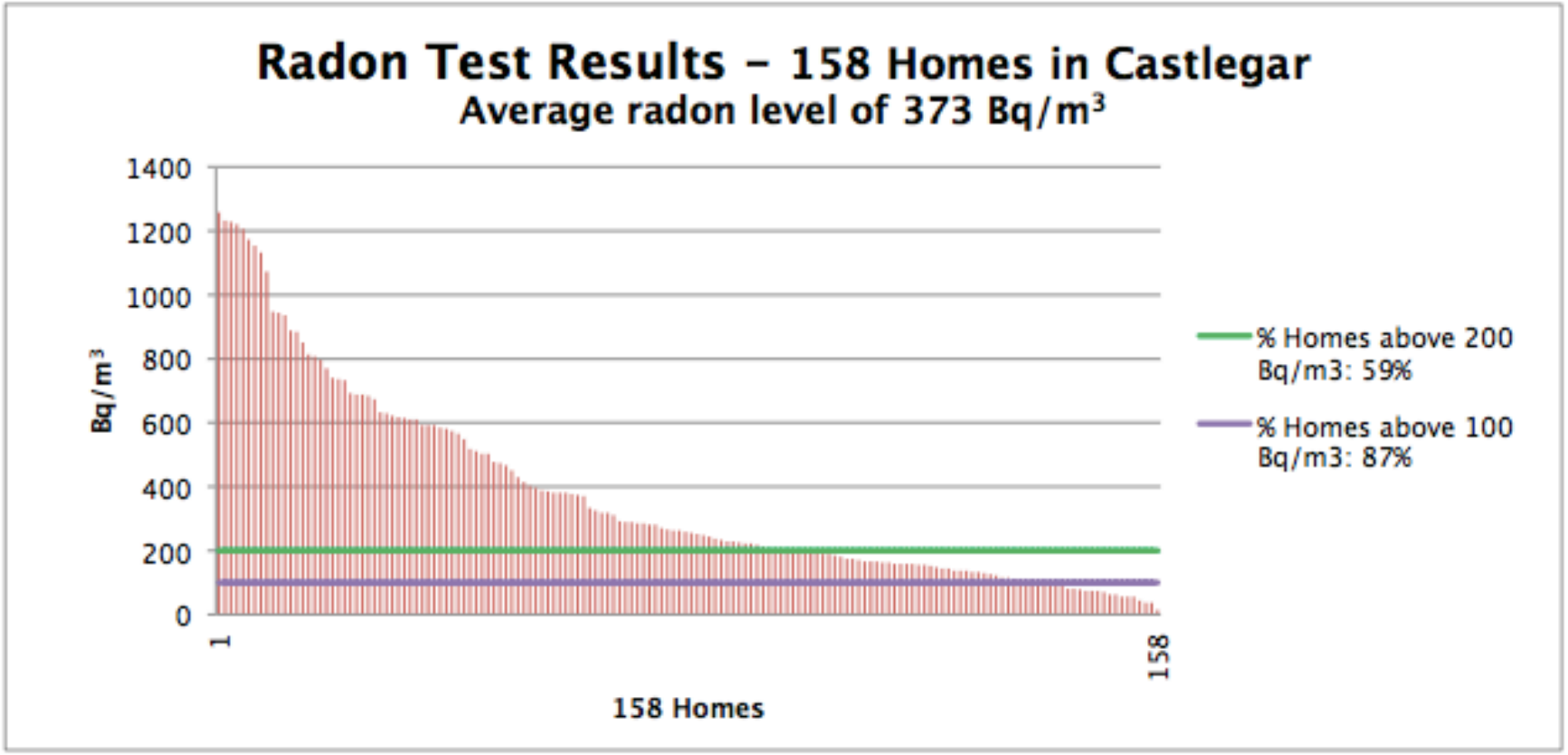
- 29.3% of homes in **Kootenay-Boundary region** tested had indoor radon levels above 200 Bq/m^3
- 17.4% of homes in **Okanagan region** tested had indoor radon level above 200 Bq/m^3



BC Community Radon Testing Projects

Chart 1 - Radon Test Results: All Homes in Castlegar

RADON AWARE
the lung association



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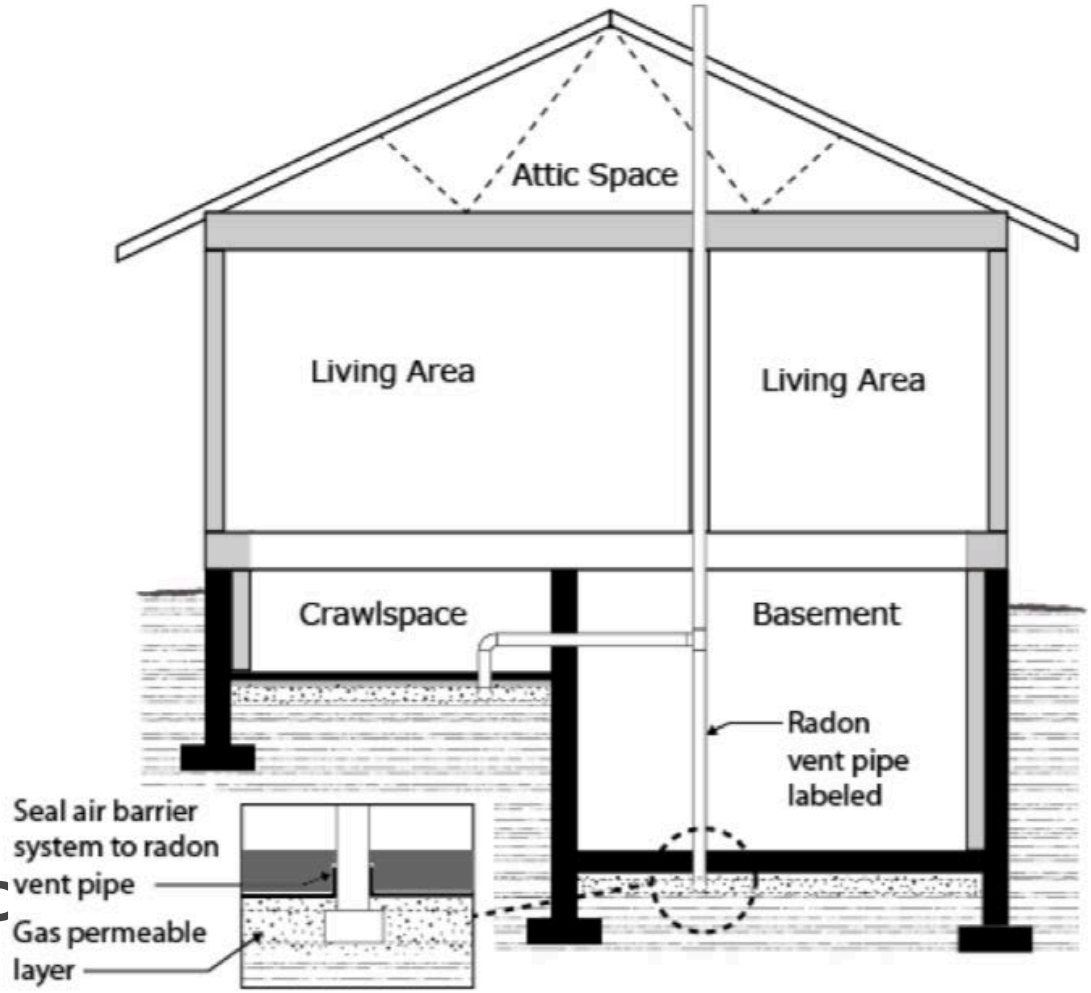
BC Building Code Changes 2018

- Part 9 of BC Building Code requires some buildings to have a radon rough-in for a subfloor depressurization system, in some locations in the province outlined in Bulletin B14-07
- **Building Inspectors play a role in supporting the enforcement of the BC Building Code**



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Radon in Columbia-Shuswap region

- High uranium content in the soil makes this risk area for radon
- High radon can be found in all types of buildings:
  - Residences, schools, workplaces
  - Buildings with no basements or crawlspaces
  - Old drafty buildings and new well sealed buildings
- In Revelstoke over 35% of residences are testing above 200 Bq/m^3
  - Some Revelstoke homes have measured radon levels more than 20 times the Federal Radon Guideline

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Radon Mitigation: How to reduce radon levels

- All buildings can be effectively mitigated
- Minimally invasive techniques
- Almost immediate results

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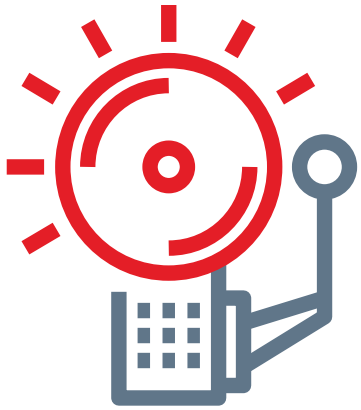
Take Action on Radon

- Take Action on Radon is a national initiative to bring together stakeholders and raise awareness on radon across Canada
  - www.takeactiononradon.ca
- The advisory team includes (CARST), Canadian Cancer Society and CAREX Canada
- Many activities happening across Canada
  - 100 Radon Test Kit Challenge

Questions?



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