Radon and Lung Cancer

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Research objective: determine which carcinogens are priorities for policy and prevention work in Canada

- environmental- community exposures
- occupational- workplace exposures

Environmental results: **Radon Gas**

- most significant exposure in terms of lifetime excess risk of lung cancer
- highest environmental priority for population level impacts

CANADIAN PARTNERSHIP AGAINST CANCER
PARTENARIAT CANADIEN CONTRE LE CANCER

Radon gas and cancer

"Exposure to Radon gas is one of the most important causes of lung cancer world-wide"

World Health Organization

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans

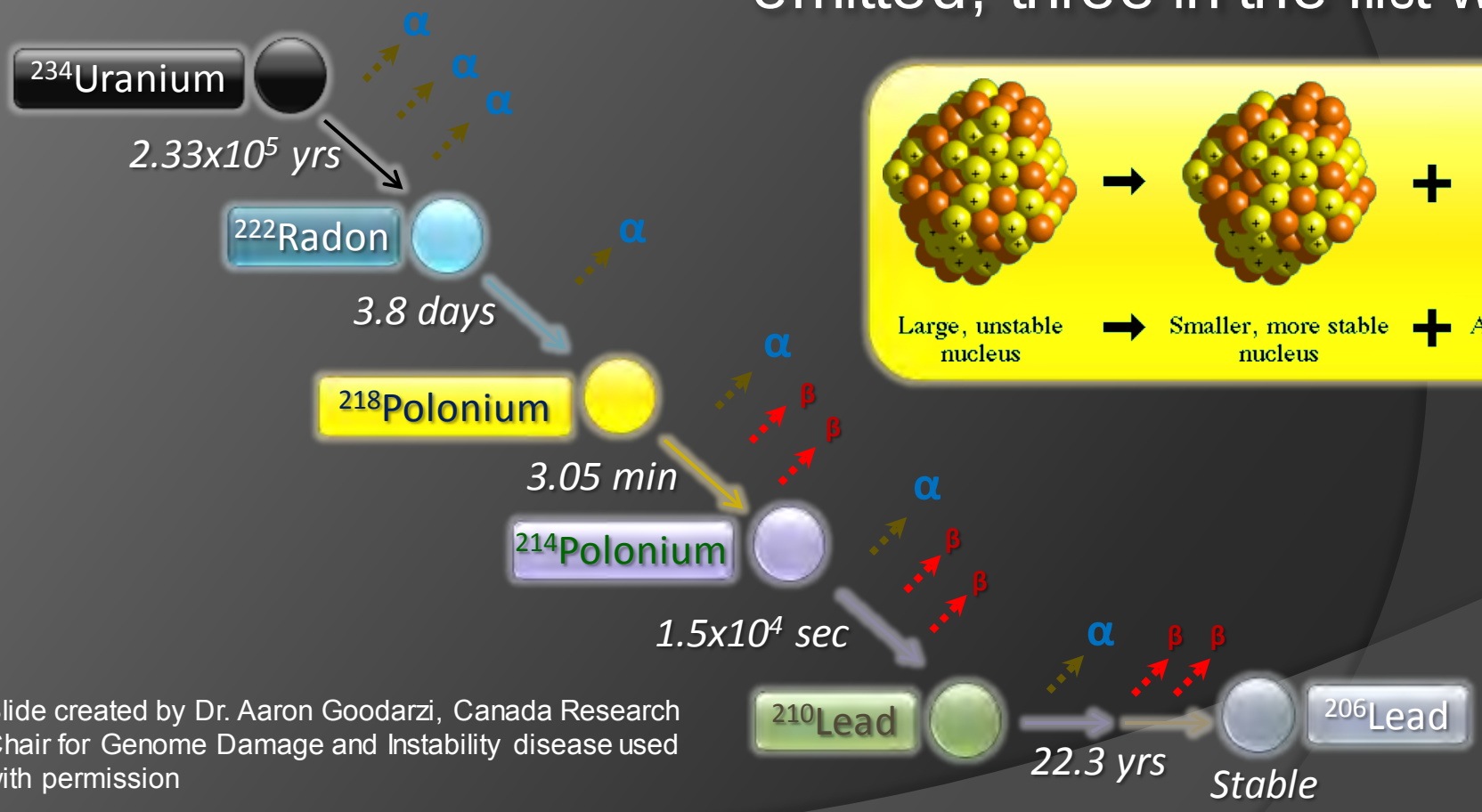
Radon and its decay products are *carcinogenic to humans (Group 1).*

In 2010, ICRP concluded that radon presents a greater risk than has been previously calculated in 1993

ICRP INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

Radon = α-particle radiation

For every atom of Rn^{222} inhaled, **four α-particles** are emitted, three in the first week



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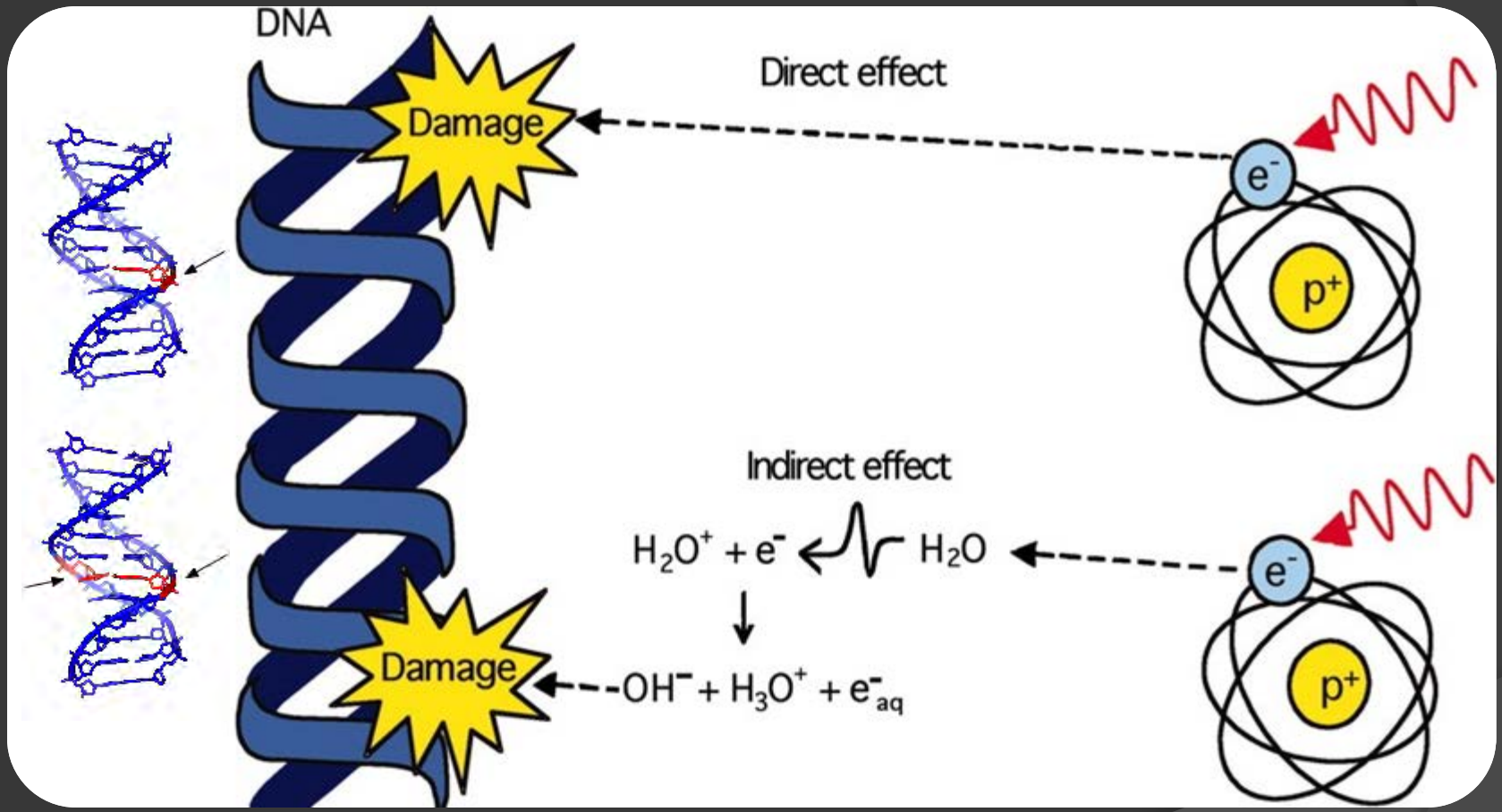
Alpha radiation causes DNA damage



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Radiation and DNA damage

Alpha radiation is powerful, but over a short distance

In the lung and respiratory tract, 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

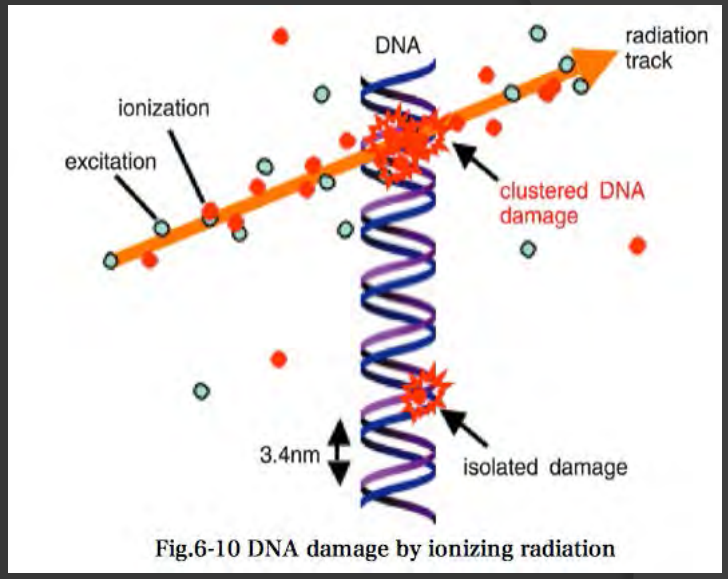
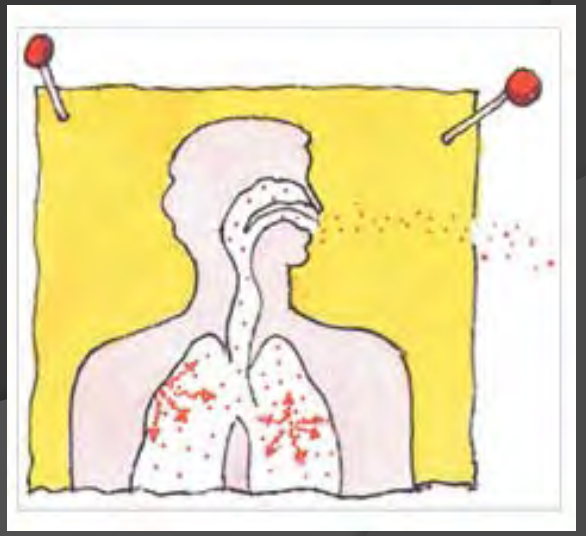


Fig.6-10 DNA damage by ionizing radiation



Strategies for reducing risks

Education and priority setting

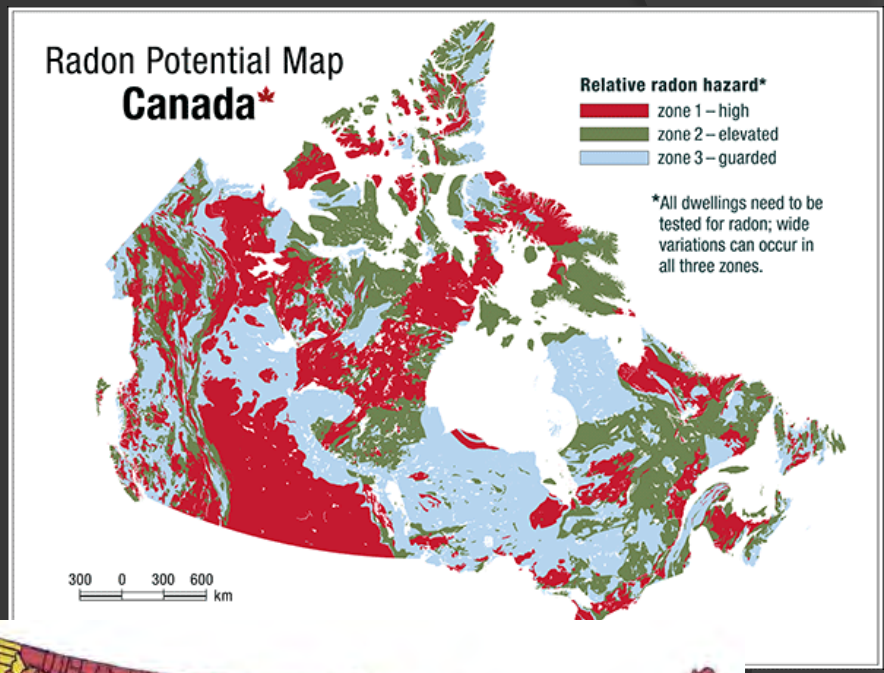
Radon exists across the country

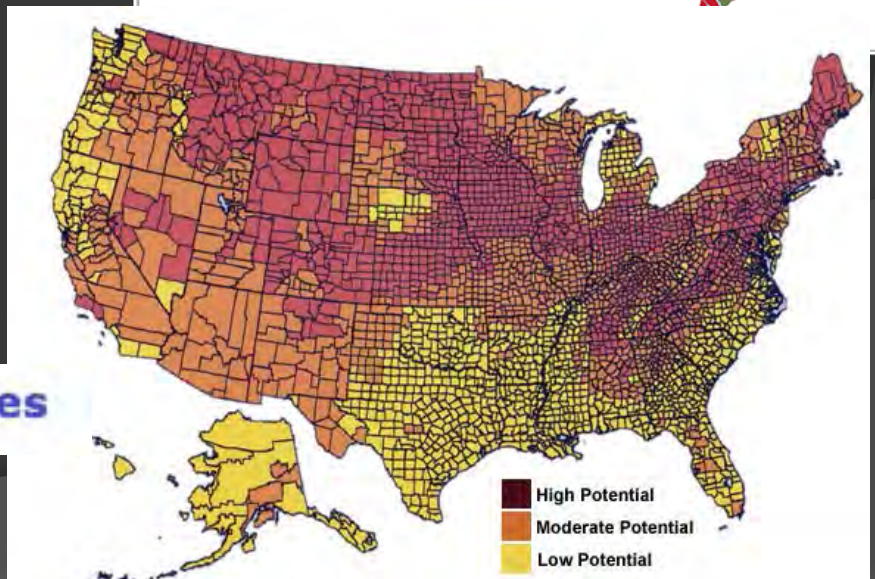
Current Canadian strategies require *awareness of radon for:*

- Public Health
- Provincial Governments
- Health Researchers *and*
- the public

Building Codes, testing programs and remediation require:

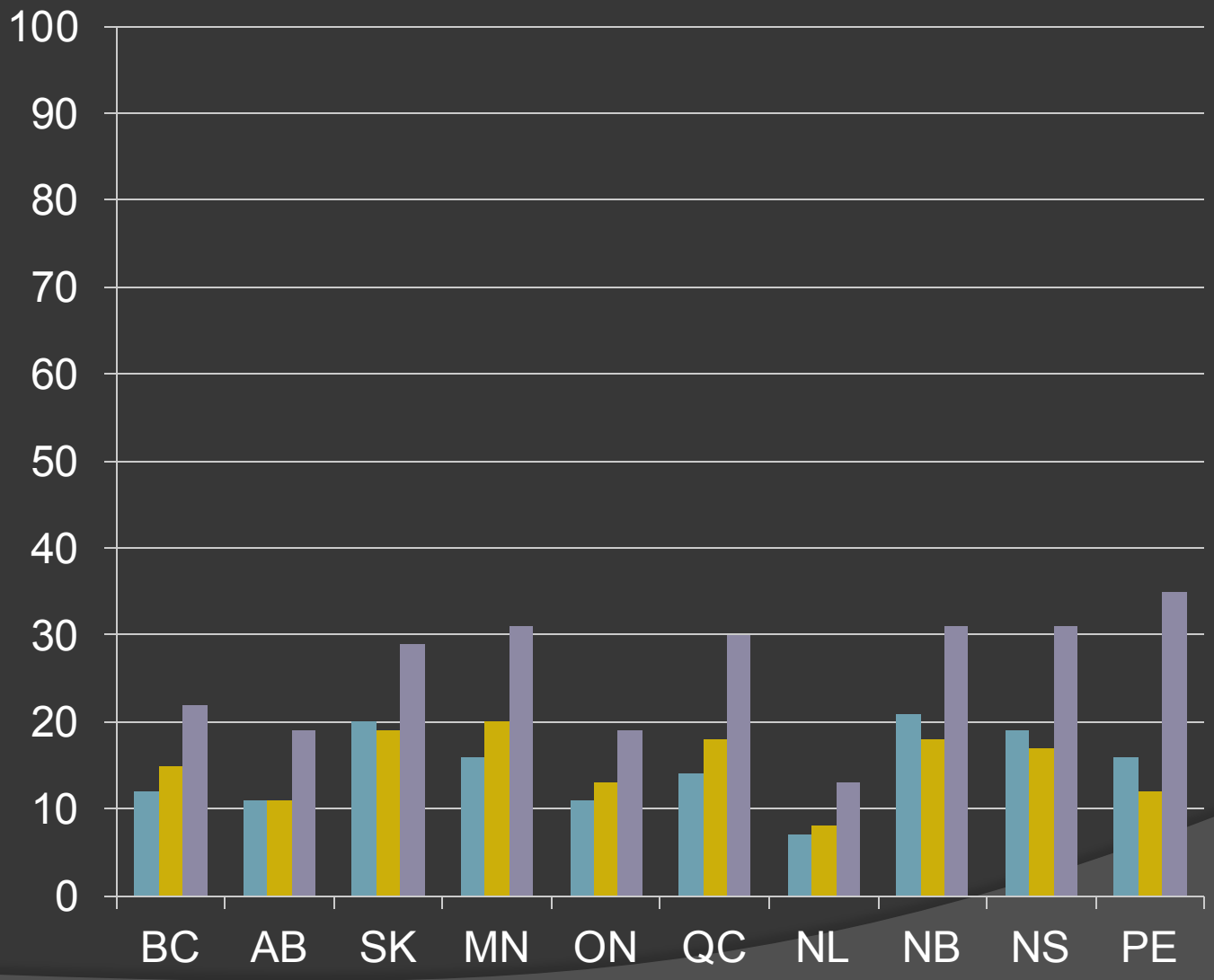
- training
- education
- expertise



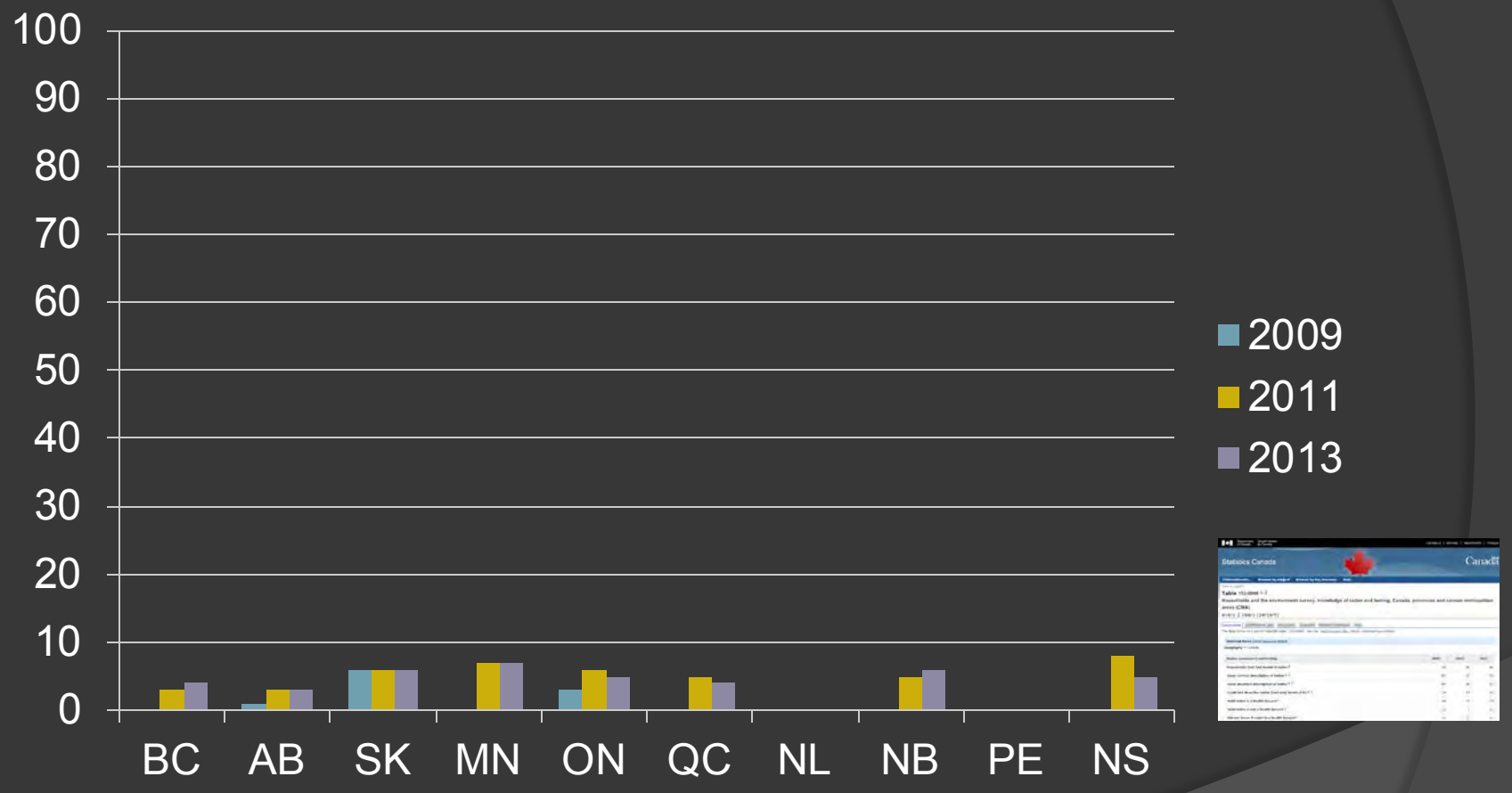


EPA Map of Radon Zones

Statistics Canada: Households able to correctly describe radon gas (%)



Households* (%) that have tested for radon gas†



*As a percentage of all households that did not live in an apartment and had heard of radon

†Survey notes to use data with caution

Why aren't people testing?

- The absence of regulatory requirements means leaving change to the realm of personal action
  - People need to be aware and be **motivated**
    - **Denial, invisible nature of gas all contribute**
  - Few studies have found strategies that increase testing
- Test kits still aren't readily available in all parts of the country
- People fear the downstream costs of remediation

Reducing lung cancer risk from radon gas

- More leadership: legitimize the risk of living with radon- more than just one agency
  - Multiple levels of government and public health
  - Building trades, researchers, real estate
  - Building radon out to save future lives
- Provide financial incentives and support
  - Many options from other countries
    - Tax credits, renovation incentives, etc.
- Workplace exposure can also be significant
  - More testing and remediation requirements for workplaces

Thank you to Dr. Aaron Goodarzi and Radon Environmental

THANK YOU