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Presentation to Prince George Mayor and Council
October 18, 2021

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Overview

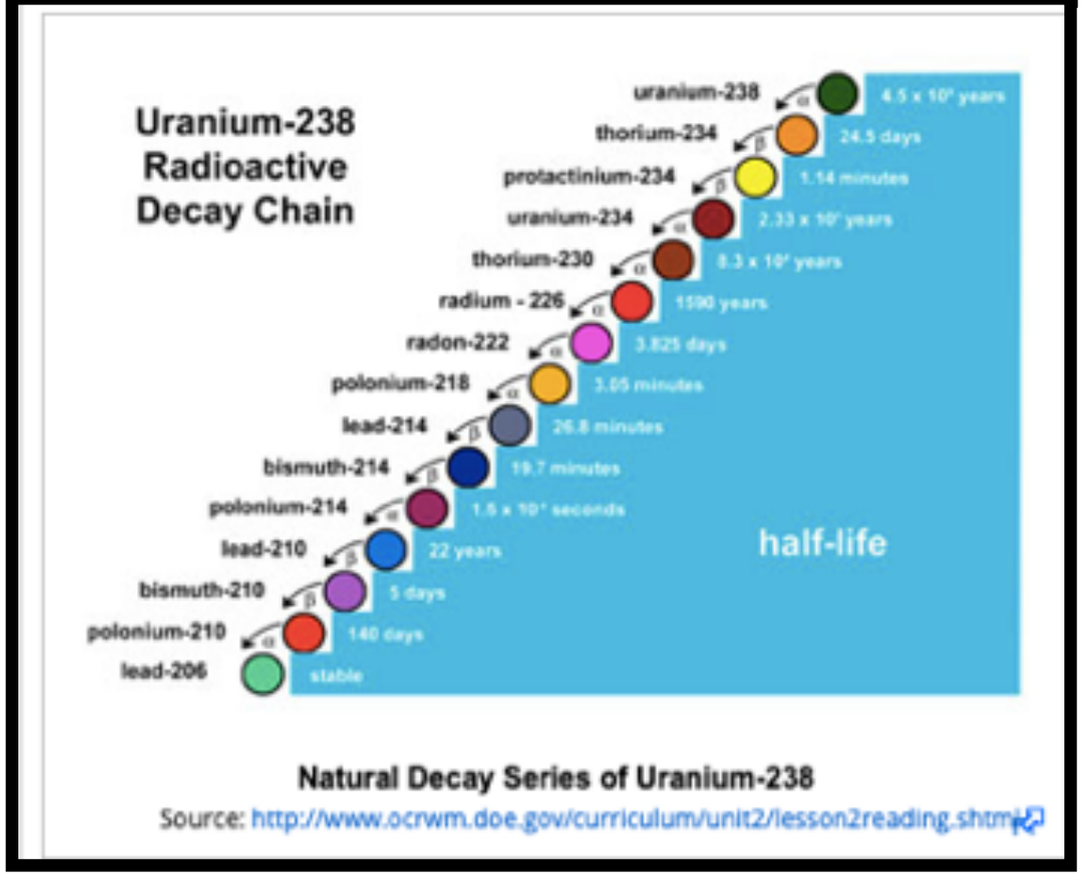
1. Radon as a New Lung Health Challenge
2. How we Know Prince George has High Radon Levels
3. Current Law and Policy
4. Steps Prince George Can Take

2

Radon as a Health Priority

Radon gas comes from uranium in the earth

- Uranium present in soils across Canada
- Some regions naturally have more uranium
  - Saskatchewan, NWT, Newfoundland, Ontario
  - Interior British Columbia
- Uranium is radioactive
  - Breaks down over time
- Radon is the only GAS phase of uranium decay
  - Radon gas is *mobile* in the soil



wikipedia/commons/d/db/UraniumUSGOV.jpg

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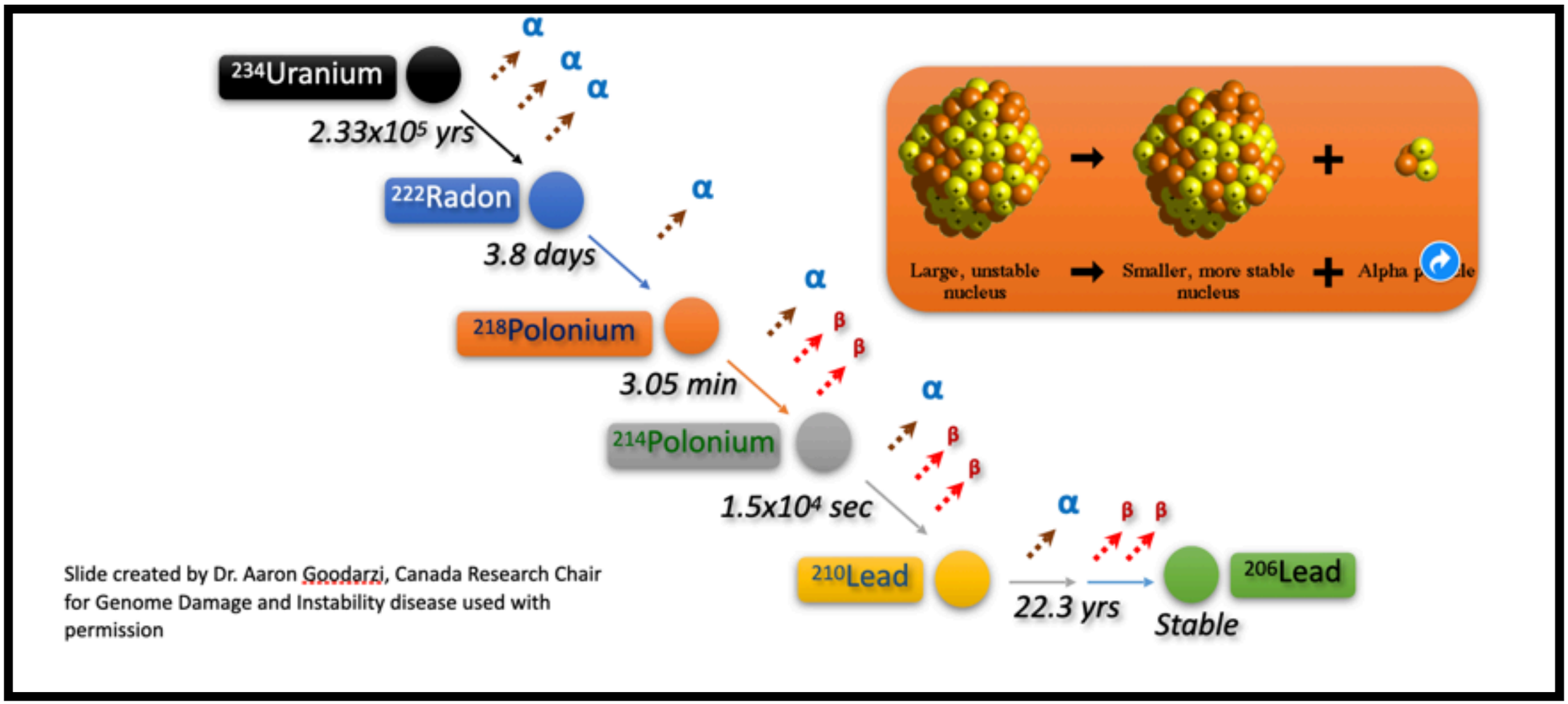
Radon = α-particle radiation

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



Slide created by Dr. Aaron Goodarzi, Canada Research Chair for Genome Damage and Instability disease used with permission

Canadians are exposed to radon mostly from indoor air

- Inside homes and other buildings
- Radon gas enters through
  - cracks in floors or walls
  - sumps or drains
- Levels generally highest in basement and ground contact rooms

Radon is a radioactive gas that is released when uranium breaks down in the ground. It can infiltrate our homes in the various ways pictured here but mitigation strategies can reduce this exposure in both new and existing structures.

CAREX CANADA

Radon leads to damage in lung tissues

- Alpha particle radiation can completely break DNA bonds
    - This type of clustered damage is more difficult for cells to repair
- More dangerous to chromosomes than beta- or gamma- radiation
- Radon is classified as a potent, known human carcinogen by the WHO and Health Canada

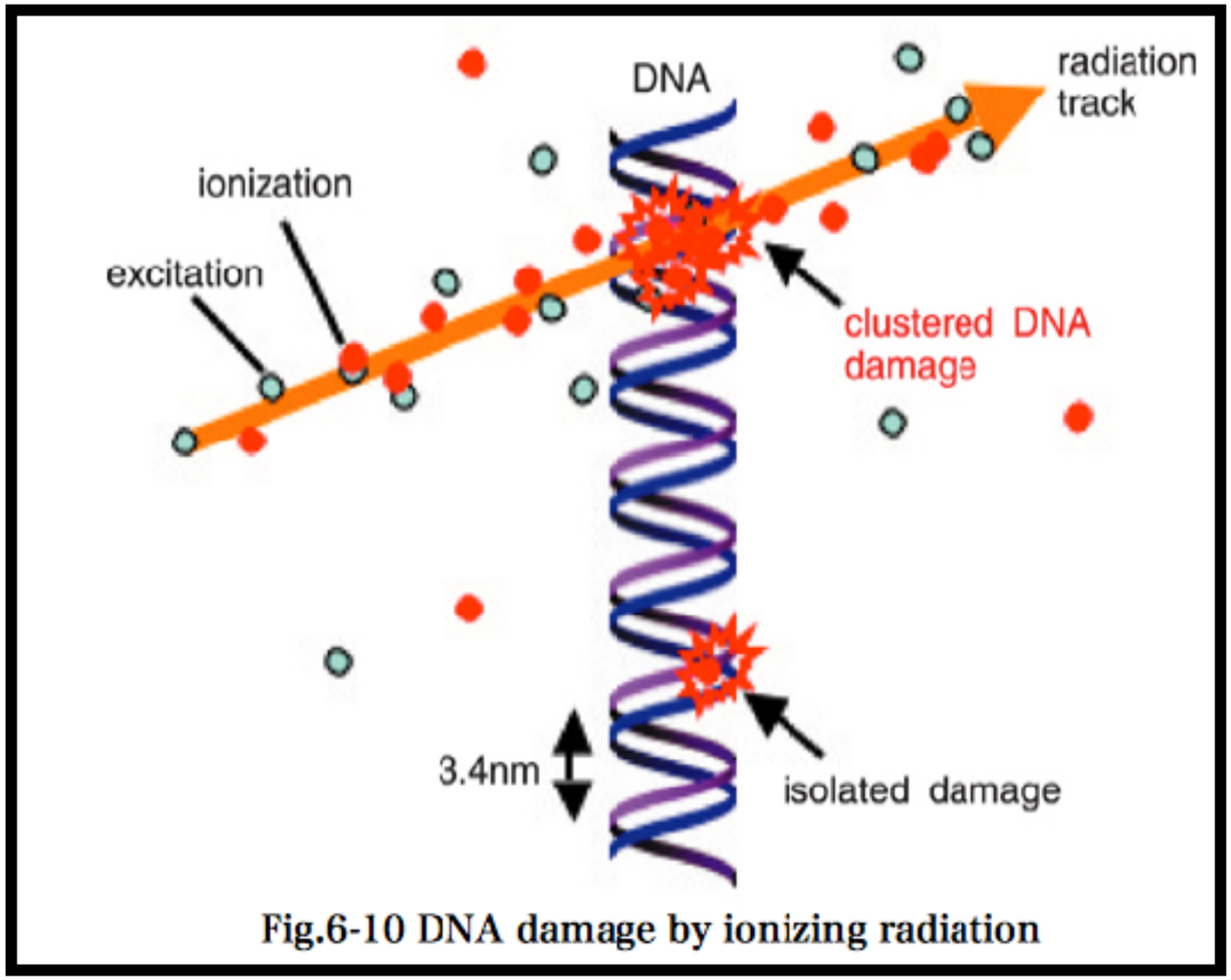


Fig.6-10 DNA damage by ionizing radiation

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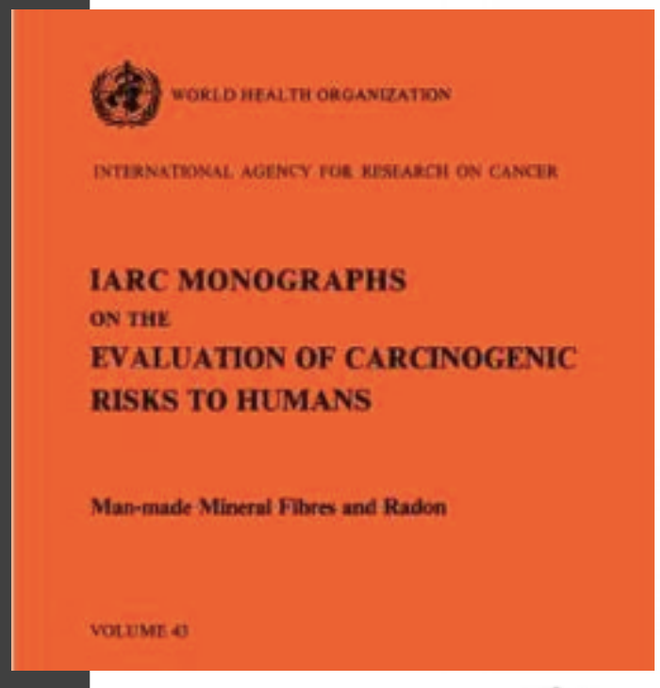
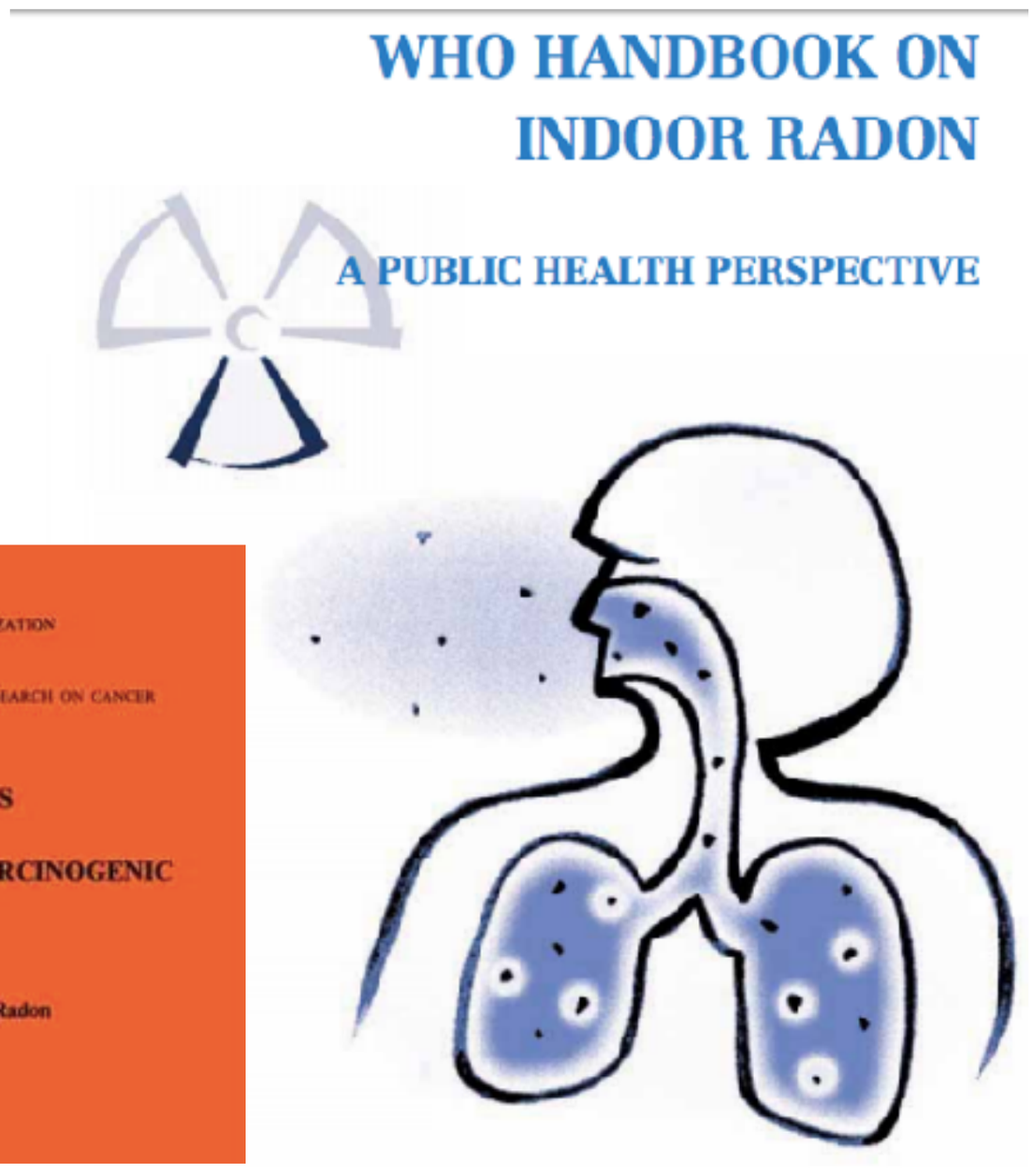
Chronic inhalation to radon *clearly* causes lung cancer

Health Canada estimates around *3,300* people die from radon-related lung cancer every year

Lung Cancer is the leading cause of cancer death in Canada





World Health Organization

Lung Cancer in British Columbia

Canadian Cancer Society

Government of Canada / Gouvernement du Canada

Canadian Cancer Society / Société canadienne du cancer

BC-specific stats 2020

Summary of projected number of cancer cases and deaths in British Columbia (BC) in 2020*

Cancer	Males		Females		Both sexes	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
All cancers	**14,200**	**5,900**	**13,200**	**5,200**	**27,400**	**11,100**
Prostate	3,100	610	NA	NA	3,100	610
Breast	30	10	3,500	660	3,530	670
Colorectal	2,100	730	1,650	660	3,750	1,390
Lung and bronchus (lung)	1,550	1,250	1,750	1,300	3,300	2,550
Bladder	1,150	290	300	95	1,450	385
Non-Hodgkin lymphoma	630	230	530	150	1,160	380
Melanoma	630	100	550	60	1,180	160
Uterus (body, NOS)	NA	NA	930	160	930	160
Leukemia	520	230	360	180	880	410

Lung Cancer has a particularly large impact on the BC population.

Over 25% of all BC cancer deaths are from Lung Cancer

The majority of those with lung cancer (81%) will die within 5 years

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MENU

Canada.ca > Health > Publications – Health > Publications – Health risks and safe

https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/government-canada-radon-guideline.html

Government of Canada Radon Guideline

Did you know?

The Canadian guideline for radon is 200 becquerels per cubic metre. If the radon level is found to be high, it can be fixed.

Points of clarification

1. In addition to residential homes, the term "dwelling" in this guideline also applies to public buildings with a high occupancy rate by members of the public such as schools, hospitals, long-term care residences, and correctional facilities. The following settings are excluded from this guideline:
   a. Uranium mines, which are regulated by the Canadian Nuclear Safety Commission;
   b. Other mines (e.g., fluorspar mines), which are regulated by provincial mining authorities; and
   c. Other workplaces which would be addressed by existing guidelines for naturally occurring radioactive materials (NORM). Details are given in the *Canadian Guidelines for Management of Naturally Occurring Radioactive Materials (NORM)* and a copy may be viewed or downloaded.

The World Health Organization suggests 100 Bq/m³ is a better guideline

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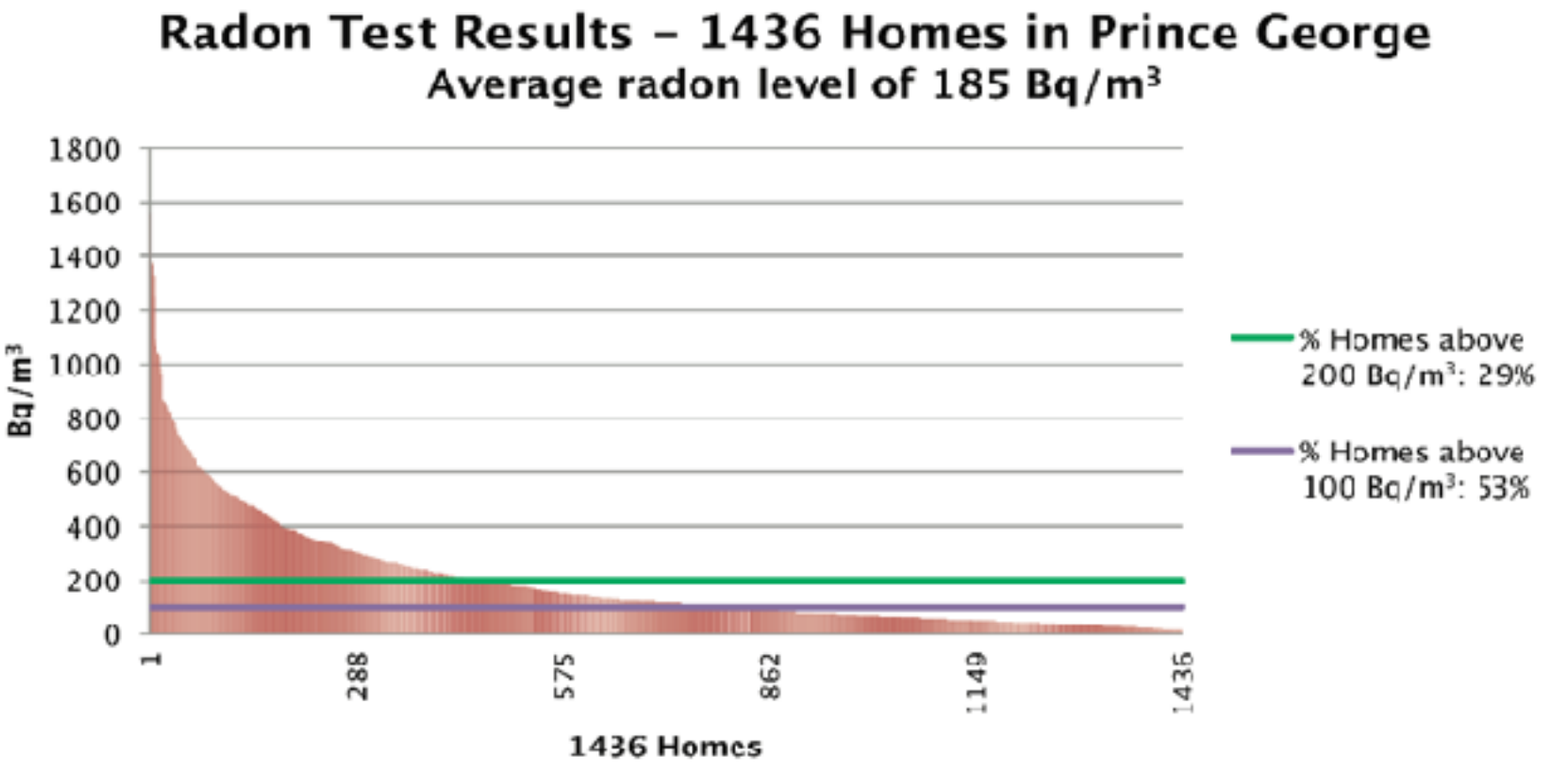
Radon Testing in Prince George

RADON AWARE
THE LUNG ASSOCIATION™

Chart 1 - Radon Test Results: All Homes in Prince George



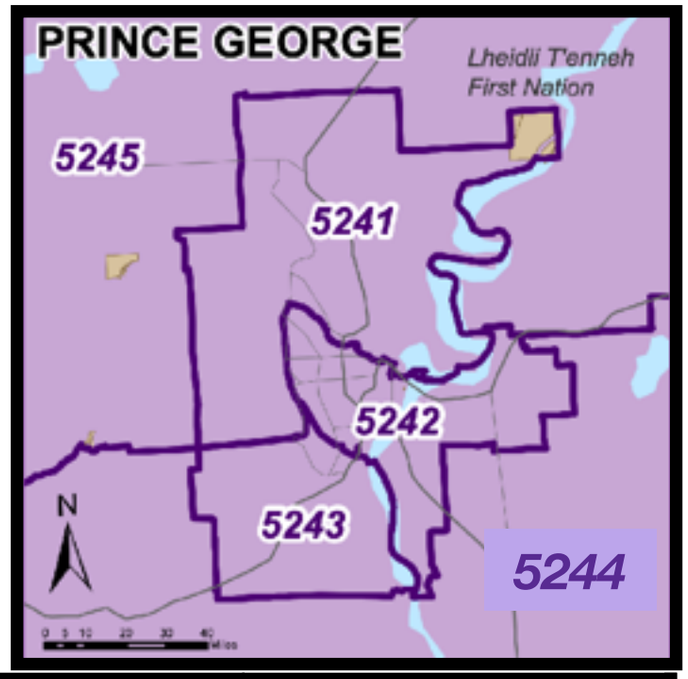
The BC Lung Association in partnership with the Fraser Basin Council conducted an Indoor Radon Testing Project in the Prince George area in winter 2014.

29% of homes tested were above 200 Bq/m³ in Prince George

Small uptake in mitigations from 2015 to 2016 but now very slow—only 2 mitigators in Prince George, who have very little work

New British Columbia Radon Data Repository Numbers

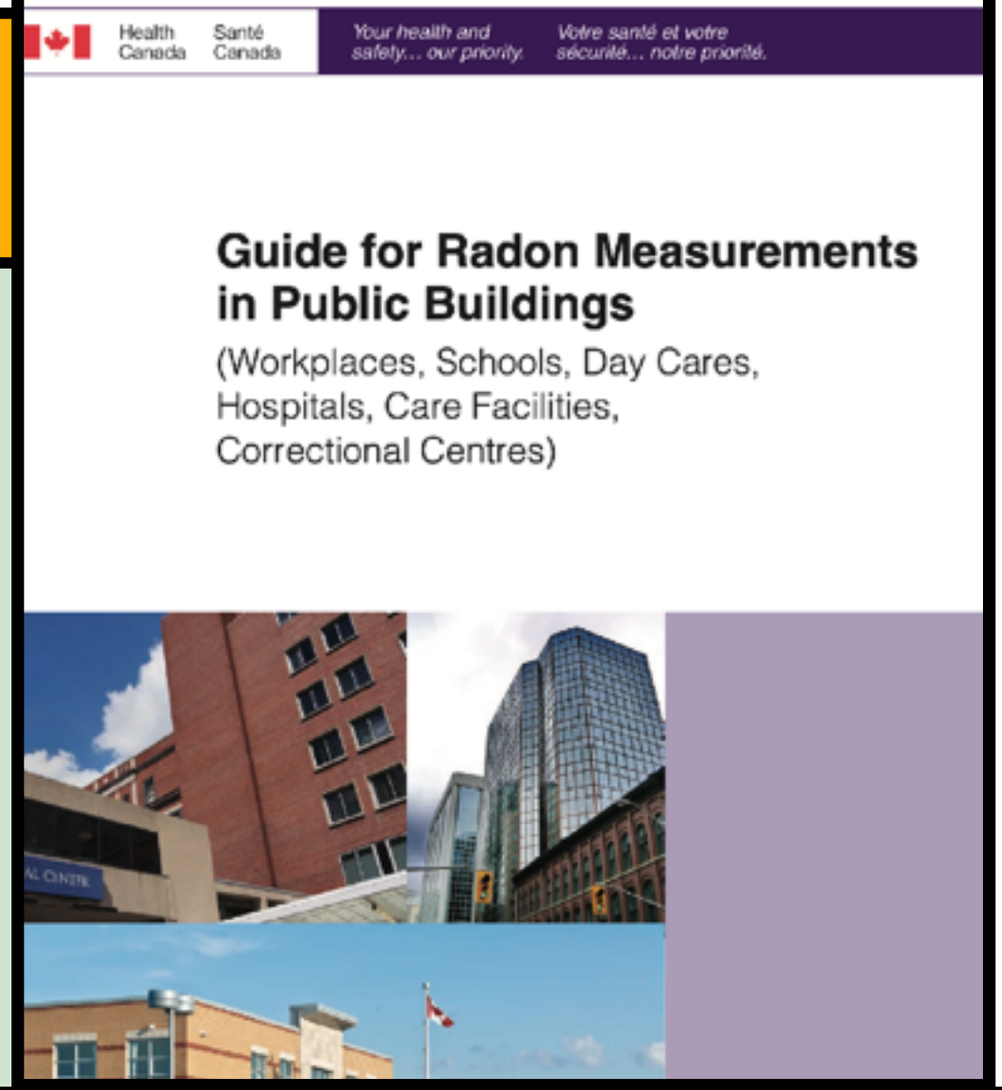
- **Housed at BC Centre for Disease Control**
- **Compilation of radon data from multiple sources**
- **new figures released to BC Lung Sept 1, 2021**



Community Health Service Area	Total Buildings tested	Number and percentage over 100 Bq/m^3	Number and percentage over 200 Bq/m^3	Number and percentage over 600 Bq/m^3	Number and percentage over 1000 Bq/m^3
Prince George City - North 5241	433	172 (40%)	97 (22%)	39 (9%)	17 (4%)
Prince George City - Central 5242	1113	778 (70%)	504 (45%)	82 (7%)	22 (2%)
Prince George City - Southwest 5243	391	155 (40%)	59 (15%)	3 (1%)	2 (<1%)
Prince George Southwest Rural 5244	159	41 (26%)	10 (6%)	1 (<1%)	0
Prince George North Fraser Rural-5245	114	33 (29%)	18 (16%)	3 (3%)	0

Health Canada's National Radon Program

- testing and mapping
- the Canadian National Radon Proficiency Program (C-NRPP)
- guidance documents on how to test and mitigate
- public education and outreach
- limited Radon provisions in the National Building Code



TAKE ACTION ON RADON

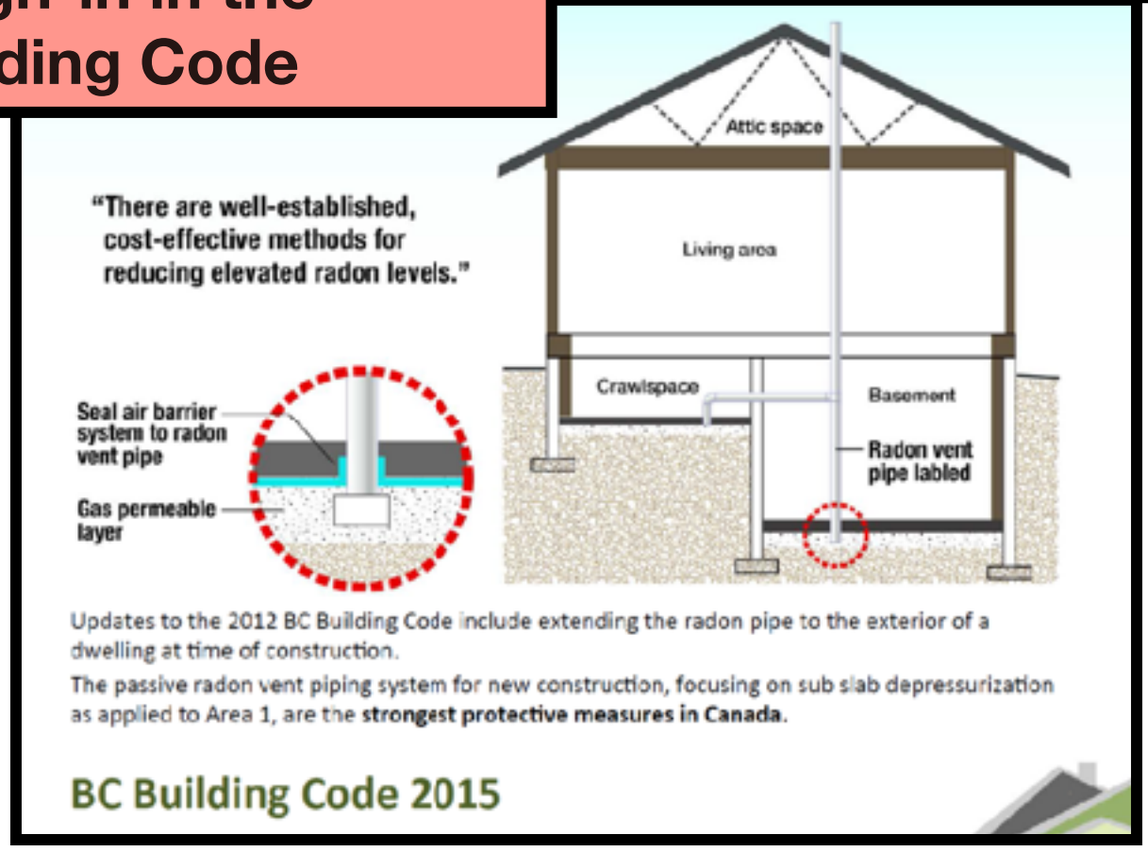
C-NRPP PNCR-C

BC provincial action—Building Code

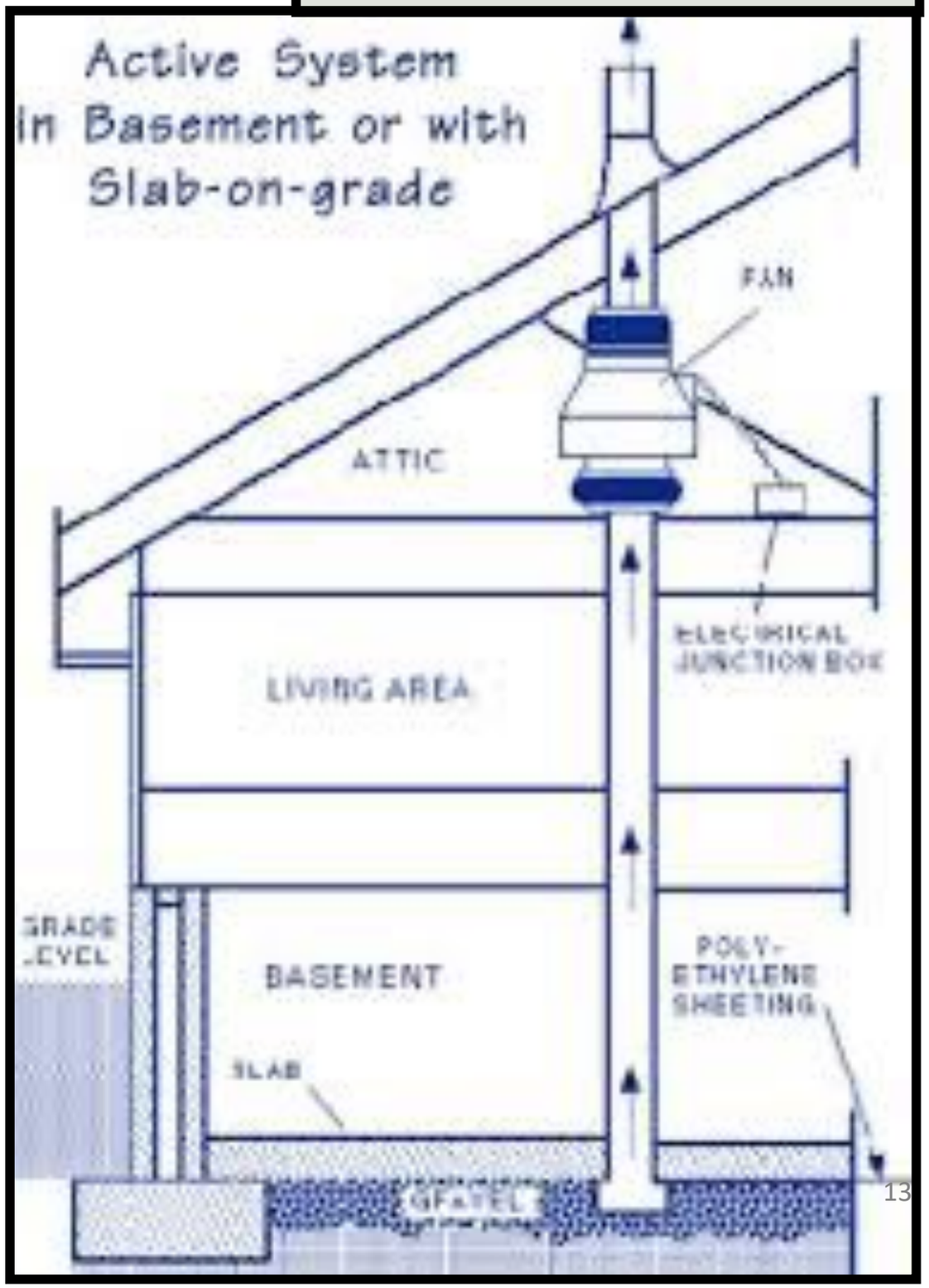
Rough-in stub

- **Found in National Building Code, most provinces**

After 2015 BC has a more complete rough-in in the Building Code



A C-NRPP certified mitigator will likely install this



There are many *general duties* around health and safety which can prompt radon action

- landlords must provide renters a state of decoration and repair that… makes it suitable for occupation (*Residential Tenancies Act* SBC 2002, c 78— section 32)
- Employers have broad duties to ensure the health and safety of their workplaces (Occupational Health and Safety Regulation, BC Reg 296/97 (OHSR), s. 4.1))
    - And also ionizing radiation (OHSR ss. 7.17 to 7.25)
- A daycare licensee must operate a daycare in a manner that will promote the health, safety and dignity of persons in care (Community Care and Assisted Living Act s. 7(1) (b))
- — The BC Interior Health Authority ordered testing in Child Care facilities
- Real estate licensees must report known latent defects— new guidance on radon

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What Can the City of Prince George do?

Proclaim November Radon Action Month

Whereas

the City of Prince George is considered to be at a greater risk for high levels of indoor radon gas; and

Indoor radon gas is known to be a serious public health risk causing as many as 16% of lung cancer deaths in Canada each year; and

Detecting levels of indoor radon gas is simple with a low cost and easy to administer test; and

If high levels of indoor radon are present in a home cost-effective solutions exist to reduce unsafe levels.

Now, therefore,

I, Lyn Hall, Mayor of the City of Prince George, do hereby proclaim November 1st To November 30th as RADON ACTION MONTH in the City of Prince George

Start Longer Term Radon Action

Set a Goal	“reduce the number of homes in this city with elevated radon by half within 10 years”
Monitoring	Radon Testing in Municipal Buildings Community surveys on local knowledge, testing and mitigation
Education and Awareness	Municipal awareness campaigns, working with local health authorities Library Lending Projects
Radon Reduction in New Construction	Enforce Building Code Ensure Building Inspectors trained
Radon Reduction Older Homes	Standards of Maintenance, Testing Social Housing, subsidies/ incentives,
Workplaces	Clean air bylaws for public spaces
Plan Implementation	Part of municipal planning— Sustainability strategies, Healthy Built Environment strategies

Radon Policies for Local Governments

- We have funding to work on collaborating with local governments on radon action

- We have completed a legal analysis explaining municipal law powers in BC to act on radon

- Builds on Health Canada Radon Action Guides for Provinces and Territories and Radon Action Guide for Municipalities

- We offer tailored analysis

- Will visit communities

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Thank you.
Questions?

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