Considering Radon in BC Rental Housing

Advocating for radon inclusion in residential tenancies law to protect renters and alleviate power imbalances between renters and owners.

Submitted to the:

BC Rental Housing Task Force

June 28, 2018

Helping Canadians reduce RADON risk.

SUBMITTED TO THE BC HOUSING TASK FORCE BY:

The Canadian Association of Radon Scientists and Technologists (CARST)

Mission Statement:

CARST's mission is to bring together individuals and organizations who are driven to help Canadians reduce their radon exposure and prevent lung cancer from radon.
We provide a place where Canadians can find information, resources and professionals to help them understand how to reduce their radon risk.
We provide our members with radon-relevant resources, opportunities to learn more about radon research, standards and best practices, and a place to connect with other stakeholders across the country.

Vision:

Our vision is to be the authoritative voice on radon in Canada and help Canadians reduce radon risk in their home, workplace and public environment by promoting public awareness and supporting the transfer of radon information for the benefit of members, consumers and public at large.

Pam Warkentin,
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Summary

Radon gas is the second leading cause of lung cancer in Canada and the first if you are a non-smoker.[1] Approximately 3,300 people die from radon related lung cancers every year. Radon is an odourless and colourless soil gas that seeps into buildings through cracks in the foundation. As uranium breaks down in soils and rocks, it releases radon gas, which is radioactive. While uranium can exist in concentrated deposits, small amounts are found in most soils and rocks across the country. In 2012 Health Canada's Cross-Canada Survey of Radon Concentrations in Homes found that 7.9 percent of homes in British Columbia had unacceptable levels of radon.[2]

Fortunately, radon is easy to measure using radon detection equipment and we have inexpensive technology that can be put into homes to mitigate radon. Costs range from 1,000 to 3,000 for a single-family house.[3] Many organizations in British Columbia and Canada now research or advocate for radon awareness and action, including CAREX Canada, the Canadian Association of Radon Scientists and Technologists, The Lung Association, the Canadian Cancer Society, RadonAware, The David Suzuki Foundation, Canadian National Radon Proficiency Program(C-NRPP) and Health Canada. Now we need the proper legislative framework to protect all residents from radon, including renters.

We thus propose:

- That landlords must test their properties for radon
- Test results made available to all prospective and existing tenants
- If radon levels exceed the Government of Canada' Radon Guidelines of 200 Bq/m^3, mitigation must occur within reasonable timelines using a C-NRPP certified professional
- Public Health official be empowered to issue orders to landlords to test and mitigate where necessary
- Significant penalties for landlord noncompliance

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[1] Chen, J., Moir, D., and Whyte, J. 2012. Canadian population risk of radon induced lung cancer: A re-assessment based on the recent cross-Canada radon survey. Radiat. Prot. Dosimetry. 152(1–3): 9–13.

[2] Health Canada, 2012. Cross-Canada Survey of Radon Concentrations in Homes - Final Report. https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/cross-canada-survey-radon-concentrations-homes-final-report.html#a10

[3] Health Canada, 2013. Radon - Reduction Guide for Canadians.Cat.: H129-33/2013EEnviromental Protection Agency. Consumer's Guide To Radon Reduction.How to fix your home. epa.gov/radon/pubs/consguid.html; Environmental Protection Agency, 2013. Consumer's Guide To Radon Reduction: How to fix your home. EPA 402/K-10/005 available at https://buildingadvisor.com/wp-content/uploads/2015/11/EPA_Radon_Reduction.pdf

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- Radon mitigation be included in broader initiatives oriented towards creating a healthy, sustainable built environment

Radon is a Public Health Issue

For most Canadians a healthy home is a home in good physical condition that provides adequate heat in cold weather, sufficient light and ventilation, security from intruders, as well as the basic services of a safe and adequate water supply, sewage disposal, and household waste collection. These requirements are reflected in building, fire and plumbing codes, as well as public health regulations. As health science evolves, so too does our understanding of what makes a healthy home. In the last three decades, there has been increasing recognition of the health effects of radon gas in the home.[4] Radon, otherwise known as "soil gas" is widely present in the ground, caused by the decay of uranium. It is a naturally occurring source of ionizing emitting radiation. Radon potential maps use geological data to assess the likelihood of high radon concentrations in the build environment. Maps for British Columbia show much of the province has high radon potential.[5] This was confirmed by Health Canada in in its 2012 Cross Canada Survey.[6] Key elements of radon protection for the general public include control measures for any building where people spend a lot of time.[7]

Law, policy and technology in Canada are moving very slowly to address this very serious issue. In a comprehensive review of law and policy on radon in Canada in 2014, Barbara Dunn and Kathleen Cooper, with the Canadian Environmental Law Association, note that few if any laws exist of general application that cover the majority of homes (included rented homes) in Canada. No provincial laws were specifically drafted to regulate radon in indoor air.[8] However, Canada's National Radon Program has conducted research, pan-Canadian monitoring and mapping, and created national guidelines and guidance

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[4] Key documents include Environmental Protection Agency, 2001. Building Radon Out. EPA/402-K-01-002 available at https://www.epa.gov/sites/production/files/2014-08/documents/buildradonout.pdf accessed May 15, 2018; 2009. WHO Handbook on Indoor Radon: A Public Health Perspective. eds. Zeeb, J. and Shannoun, F. World Health Organization

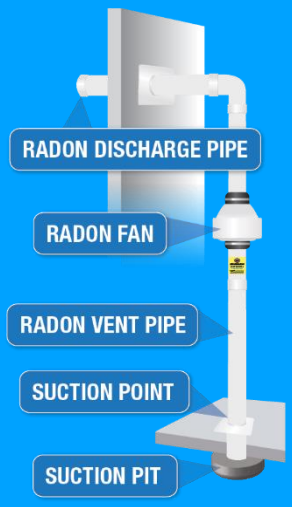
[5] Radon Environmental Management Corp. 2012. Mapping the Geological Radon Potential in Canada. Available at http://www.radonaware.ca/database/files/library/British_Columbia_Radon_Potential_Map.pdf accessed June 21, 2018

[6] Health Canada, 2012. Cross-Canada Survey of Radon Concentrations in Homes. https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/cross-canada-survey-radon-concentrations-homes-final-report.html

[7] Phipps, E., Nicol, A.M., Giesbrecht, D., Cooper, K., Baytalan, G. and Bush, K., 2017. Call for action on radon in child care settings. Environmental Health Review, 60(3), pp.77-81.

[8] Dunn, B. and Cooper, K. 2014. Radon in Indoor Air: A Review of Policy and Law in Canada. Canadian Environmental Law Association. at p. 77

documents for diverse professionals concerning radon.[9] In 2007 the federal government issued Radon Guidelines giving a reference level of 200 Bq/m^3 — homes should have no more than these concentrations of radon. Unfortunately, these guidelines require implementation in provincial laws, given Canada's system of division of federal and provincial powers.



The technology exists to fix radon problems. "Sub-slab depressurization" is a building technique whereby a hole is drilled in a building foundation and a vent pipe is installed. The National Building Code, 2010 recommends a radon 'rough in', whereby a hole is drilled and a short pipe provided—if subsequent testing shows high radon levels, home owners can, at little extra cost—add a full venting system with a fan.[10] More recently, the Standards Council of Canada has recently completed its non-binding "Radon mitigation options for existing low-rise residential buildings", recommending the full system with a fan.[11] Health Canada has initiated a certification system for radon measurement and mitigation providers ensuring a trained body of professionals through the Canadian National Radon Proficiency Program (C-NRPP).[12] Training programs can be quickly implemented and delivered on a regional basis when demand for certified professionals increases. Referring to a certification program for the mitigation provides a both landlords and tenants a resource to fix the problem, and referring to a third-party source ensures the problem is fixed properly and the tenant is protected from a landlord installing a do-it-yourself system which may not properly reduce radon levels.

Provinces are beginning to incorporate some radon protections. The BC Building Code is a harmonized standard for the whole province (with exceptions for Vancouver and Indian Reserves). It does adopt, broadly, the National Building Code requirements for radon but only for geographical areas deemed to be high in radon east of the Coast Mountains.[13] In later 2017 new changes were proposed specifying cities with high radon exposure.[14]

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[9] Health Canada website; See multiple links, e.g.,: "Radon": https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon.html; "Testing your home for radon": http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/radon-eng.php#a7; Government of Canada Radon Guideline: http://www.hc-sc.gc.ca/ewh-semt/radiation/radon/guidelines_lignes_directrice-eng.php.

[10] Decker, B. and Wood, B., Radon-Soil Gas Infultration Control: A Comprehensive Review of Radon Resistant Construction, Mitigation Requirements and Options in Ontario available at http://obec.on.ca/sites/default/uploads/files/members/CCBST-Oct-2014/B6-2-a.pdf.; see also Cooper and Dunn, 2014. Radon in Indoor Air: A Review of Policy and Law in Canada. Canadian Environmental Law Association.

[11] http://publications.gc.ca/collections/collection_2017/ongc-cgsb/P29-149-012-2017-eng.pdf

[12] Canadian National Radon Proficiency Program. 2018 Website. https://c-nrpp.ca

[13] Government of British Columbia, 2014. Information Bulletin, Building and Safety Standards Branch. New Radon Rough-in Requirements. Information Bulletin, Building and Safety Standards Branch.. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/bulletins/b14-07_new_radon_rough-in_requirements.pdf Accessed March 29, 2018

[14] https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/other/2018_bcbc_11_radon.pdf

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Alberta has recently passed Bill 209, ***Radon Awareness and Testing Act***.[15] This calls for the government to promote public awareness and for mandatory testing requirements for child care facilities. Especially in Ontario there have been significant recent steps to address radon. In 2016 Ontario's Ministry of Labour updated its radon policies to require radon protection under Occupational Health and Safety regulation.[16] Ontario's New Home Warranty is administered by Tarion, and it explicitly warrants new home construction against levels of radon exceeding 200 Bq/m^3.[17] The ***Ontario Public Health Standards*** and ***The Healthy Environments and Climate Change Guideline, 2018***. Both include explicit mention of radon. Boards of health are asked to consider planning and implementing public awareness initiatives to address environmental exposures to radon. They are to develop and implement mitigation strategies for radon exposures. A recent survey of Ontario Public Health Units showed a majority had some kind of radon program started as a response to the new standards. The activities were, for the most part, testing of houses, child cares facilities, schools and apartment buildings, A number of health units gave out subsidized or free radon test kits, often as part of local studies.[18]

However, across Canada, there remains significant and troubling gaps concerning radon protection for renters.

Why Renters Face Significant Problems

One reason for slow action on radon in Canada has been the assumption that home owners are free to undertake testing and mitigation on their own accord. For Canadians who own their own homes and live in single family housing, mitigation is relatively uncomplicated. Existing home owners can call radon mitigation professionals, have their houses tested, and install radon protection for about three thousand dollars. However, these assumptions do not work for renters. Renters have little ability to influence landlords where there are no legal requirements. Renters also face various problems with split motivations. If the landlord buys and supplies all of the components of a home, they have a motivation to do so at the lowest possible cost. Alternatively, the tenant has various motives (such as to have efficient energy heating and radon mitigation) but no control over the means to do so. There may be restrictions imposed on them by the landlord as to what modifications they can make to the building and there can barriers due to time frames. Tenants often have no idea for how long they will reside in their current location. This detracts renters from investing in upfront

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[15] The Bill is available here: http://www.assembly.ab.ca/ISYS/LADDAR_files/docs/bills/bill/legislature_29/session_3/20170302_bill-209.pdf.

[16] Ontario Ministry of Labour, 2016. Radon in the workplace. Available at https://www.labour.gov.on.ca/english/hs/pubs/gl_radon.php accessed may 7, 2018.

[17] Tarion: Radon and Your Warranty. https://www.tarion.com/homeowners/your-warranty-coverage/radon-and-your-warranty

[18] van Meer, R., MacIntyre, E, and Copes, R. 2018. Ontario Public Health Unit Radon Survey (winter 2017/2018) . Public Health Ontario.

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capital cost investments into their units, how long will they benefit from it, will the landlord decide to sell or change rental status and they could lose their investment. Household surveys typically show renters move every two years, with the result that they would incur much higher costs than owners if they were to fund upgrades themselves. Low-income tenants in private housing are particularly prone to these problems.

British Columbia has not incorporated minimum radon standards into most areas of law that touch on renters.

- Landlords are under no obligation to test for radon or communicate radon levels to prospective renters.

- Building codes only cover new buildings and have only been in place for a few years.

- BC does have a very rudimentary regulatory framework for minimum standards under Public Health legislation.[19] However, provisions relate to potable water, windows and airspace only, leaving no room for action on radon. Health inspectors do not have a clear mandate to act.[20]

- The possibilities for action under the ***Residential Tenancies Act*** remain unclear. There are no clear provisions whereby renters can demand of landlords that they build mitigation systems.

- While renters who contract radon-induced lung cancer might have civil cases in negligence and occupiers liability law, causation can be difficult to prove especially where radon concentrations remain unknown

Gaps in BC's Residential Tenancies

BC's ***Residential Tenancy Act*** has some provisions which potentially touch on the radon issue, however, none do so explicitly. The only possible avenues for tenants concerning radon we found concerned general duties of repair (under section 32(1) and rights to quiet enjoyment (at s. 28). These are very broad provisions and it remains unclear whether arbitrators will accept that they cover radon. We searched Residential Tenancies Branch archived decisions and found no cases which make decisions on the basis of the presence

[19] Health Hazards Regulation, BC Reg 216/2011

[20] as documented by Dunn and Cooper, ibid.

of radon gas.[21] Radon issues are neither mentioned nor implied in the Policy Guidelines that the Residential Tenancies Branch puts out.[22]

We searched case law across the country applying provisions under general duties of repair. We found one in Ontario that did address radon and took it seriously.[23] Also a series of cases before Québec's Régie du logement deal with radon. While these were not ultimately successful, in each case the issue before the court was not whether radon was problematic, but whether high radon levels had been proven by the tenant. [24] In BC's Act the wording is not clear. The Act provides that a landlord must provide and maintain residential property in a state of decoration and repair that complies with the health, safety and housing standards required by law (s. 32(1)(a)). Absent other provincial law explicitly referencing radon, hearing arbitrators may shirk from imposing public health requirements not directly specified in law.

The principle of quiet enjoyment is a common law principle that exists prior to, and independent of statutory wording. For an act to breach the covenant, it must substantially interfere with the resident's quiet enjoyment, restricting the tenant's ability to use their residence in an ordinary lawful way, that is it "must be of such severity that the premises become "untenable"— uninhabitable as a residence".[25] A succession of cases in residential tenancies tribunals across Canada have considered public health hazards as a breach of such enjoyment, particularly in the case of second hand smoke.[26] and mold growth.[27] Radon is a chronic health problem, however, and it is unclear if hearing officers or judges would find it reaches significant severity to stop a renter from living in a unit for a limited period of time. Also, cases of quiet enjoyment typically involve the impacts of one person on another, and so are not well suited to naturally occurring health hazards.

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[21] Radon is mentioned in two cases, but it does not appear to have been central to the decision. See Decision 6972 July 31, 2017 http://www.housing.gov.bc.ca/rtb/decisions/2017/07/072017_Decision6972.pdf and Decision 2100 February 28, 2014. http://www.housing.gov.bc.ca/rtb/decisions/2014/02/022014_Decision2100.pdf

[22] c.f. Residential Tenancies Branch, 2004. Residential Tenancy Policy Guideline No. 1 Landlord & Tenant – Responsibility for Residential Premises. at https://www2.gov.bc.ca/gov/content/housing-tenancy/residential-tenancies/calculators-and-resources/policy-guidelines/policy-guidelines-listed-alphabetically

[23] CET-67599-17 (Re), 2017 CanLII 60362 (ON LTB),

[24] Duff Conacher c. National Capital Commission , file 22-051117-006G; 22-060118-001T-060227 decision of 28 September 2006, cited in Barak c. Osterrath, 2012 CanLII 150609 (at para 114) ; Barak c. Osterrath 2012 CanLII 150609; Bonin c. National Capital Commission, 2013 CanLII 122747 (QC RDL); Pickard c. Arnold, 2015 CanLII 129833; Bramley c. Vanwynsberghe, 2017 QCRDL 11313

[25] Y.A., Y.E., S.A. & B.A. v Regina Housing Authority 2017 SKORT 75 para. 95

[26] Hassan v Niagara Housing Authority (February 5, 2001), Hamilton Docket No.99-002412-DV [2000] O.J. No.5650 (Div Crt); Feaver v. Davidson, 2003 CarswellOnt 4189, [2003] O.H.R.T.D. No. 103; Lawrence v. Kaveh, 2010 BCSC 1403 (CanLII); TST-38271-13 (Re), 2013 CanLII 51007 (ON LTB); TNT-83545-16 (Re) 2016 CanLII 72018 (ON LTB) ; Y.A., Y.E., S.A. & B.A. v Regina Housing Authority 2017 SKORT 75, upheld Regina Housing Authority v Y.A., 2018 SKQB 70

[27] Northwest Territories Housing Corporation v Porter, 2015 CanLII 80110 (NWT RO)

But even if Residential Tenancies arbitrators do rule on radon mitigation there remains problems with whether this becomes binding precedent on future decisions. BC's Residential Tenancy system faces a larger problem that decisions are not consistent nor coordinated through judicial appeal. While the Residential Tenancies Branch does publish decisions in a searchable database,[28] individual decisions do not, normally, involve recitation of previous cases in the manner of superior courts. The Residential Tenancies Branch has a very limited appeal process. This is an issue that has been a long-standing concern of non-profit and civil society organizations in the province who argue for the need for a meaningful statutory review process.[29] The courts do have some limited capacity to review decisions of Residential Tenancies arbitrators, such as to ensure procedures were fair.[30] However, the BC system is designed to limit judicial oversight to where decisions are "patently unreasonable". [31] The effect is that there is no significant Superior Court case law or legal precedent built up.

We thus suggest separate provisions be added to the ***Residential Tenancies Act*** explicitly addressing radon. This will clarify the law and bring certainty to both tenants and landlords. Landlords should be required to test for radon, following Health Canada guidelines.[32] Exemptions may be made for areas with proven low radon potential. Landlords should be required to declare test results to prospective and current tenants. We feel that principles of good repair and quiet enjoyment do support mandatory mitigation, and feel landlords concerns can be addressed through statutory provisions that give them reasonable times to address the issue. Some of these measures have been adopted in some US states.[33] Florida has enacted legislation addressing radon hazards in rental properties as part of the ***Florida Radiation Protection Act***. The law requires that a radon notification be provided on "at least one document, form, or application executed at the time of, or prior to … execution of a rental agreement for any building."[34] Illinois revised its radon disclosure law to incorporate disclosure requirements for radon in rental housing.[35] In Maine, there are requirements for testing residential buildings every ten years, unless a radon mitigation

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[28] http://www.housing.gov.bc.ca/rtb/search.html

[29] Milne, K. and Cooper, K. 2014. Suggested Amendments to BC's Residential Tenancy Act. Community Legal Assistance Society. available at https://drive.google.com/file/d/0B8CaGg3N3aZdVzR1Y0ZOS3diUkU/view (accessed Feb 2, 2018. at p. 23

[30] Baker v. Canada (Minister of Citizenship and Immigration), 1999 CanLII 699 (SCC), [1999] 2 S.C.R. 817 at para. 22

[31] Judicial Review Procedure Act, RSBC 1996, c. 241 at s. 58, also see Administrative Tribunals Act, SBC 2004, c 45 and Schaper v. Beachamp, 2011 BCSC 833 (CanLII), upheld on appeal at 2012 BCCA 208 (CanLII), see also Bennett v. Wamboldt, 2012 BCSC 1251

[32] Health Canada, 2017. Guide for Radon Measurements in Residential Dwellings (Homes). Available at https://www.canada.ca/en/health-canada/services/publications/health-risks-safety/guide-radon-measurements-residential-dwellings.html

[33] For a review see Environmental Law Institute. 2017. Indoor Air Quality in Rental Dwellings: State Laws Addressing Radon, Mold and Secondhand Smoke. available at https://www.eli.org/buildings/indoor-air-quality-rental-dwellings accessed June 21, 2018.

[34] See Florida Statutes 404.056

[35] Illinois Comp. Statutes Chap. 420, §46/25 .

system is installed. Written notice of test results must be delivered to tenants within 30 days or before a tenant enters into a tenancy agreement or lease. Tenants can end the tenancy at will if radon levels are above US Environmental Protection Agency limits, and the landlord cannot retain a security deposit for this reason. [36]

Gaps in Public Health Legislation

Dunn and Cooper's 2014 review of radon law in Canada showed that health officials have a very difficult time addressing radon. While radon might be seen as a "health hazard" public health inspectors can rarely act on it. Public health legislation so far lacks specificity in terms of application to indoor air, radiation or radon, including for residential tenancies and this discourages public health officials from acting. Inspections are complaints driven but too few residents know about radon. Public health inspection and enforcement powers are intended to be case-specific, applying to particular buildings and businesses rather than promulgating new rules. There are procedural obstacles to inspection that protect people's privacy in their home and businesses. That is, unless there is consent, a warrant is needed, but a warrant would require prior knowledge of radon levels that are hard to obtain. The result is that radon testing and orders for mitigation are often difficult to make. In British Columbia there are some provisions for rental accommodation in public health regulation, but they are extremely limited and there is no way to have them touch on radon. The ***Health Hazards Regulation***, BC Reg 216/2011 at section 7 covers inadequate rental accommodation, and describes conditions that make up a health hazard. However, it is restricted to requiring potable water, minimum limits on air space per unit, and a window that can open.

Here, a notable contrast can be found in Alberta. Section 16 of the ***Residential Tenancies Act***, S.A., 2004, c. R-17.1 states (in part) that premises will meet at least the minimum standards prescribed for housing premises under the ***Public Health Act*** and regulations. In turn, The ***Housing Regulation*** [37] contains several provisions covering rental housing. There are further ***Minimum Housing and Health Standards***. Significantly, the ***Housing Regulations*** and the ***Minimum Housing and Health Standards*** are enforced by inspections of housing premises by Public Health Inspectors/Executive Officers of Regional Health Authorities on a systematic or complaint basis. The result is that in some cases, tenancy issues around habitability are handled as prosecutions for violation of the *Health Act* and Regulations in provincial court. [38] Alberta Health Services has ordered radon mitigation and developed a guidance document on radon in rental accommodation.

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[36] Maine Rev. Stat. Ann. tit. 14 § 6030-D. Radon testing. sec. 1),

[37] Housing Regulation (Alberta Regulation 173/1999 under the Public Health Act) available at http://www.qp.alberta.ca/documents/Regs/1999_173.pdf

[38] c.f. R. v. Wannas, 2004 ABPC 85; Alberta (Health Services) v Bhanji, 2017 ABCA 126; R v George, 2018 ABPC 20

Inspectors can draw on general nuisance clauses in the ***Public Health Act*** (at s. 59 to 61) and the ***Nuisance and General Sanitation Regulation***, Alta Reg 243/2003. "Nuisance" is defined as "a condition that is or that might become injurious or dangerous to the public health, or that might hinder in any manner the prevention or suppression of disease" (Public Health Act, s. 1(ee)). In one case in Calgary, inspectors responded to a renter's complaint, worked with the renter to complete tests and ordered the landlord to mitigate. [39]

We suggest that new regulations are needed under the ***BC Health Act*** that specifically address renters' health in general, and specifically address radon. Public health inspectors or officers should be empowered by statute and organizational mandate to promote radon awareness among renters, help with testing, and order mitigation when radon concentrations are too high.

Government as Landlord

In British Columbia, BC Housing leads the development, management and implementation of social housing in the province, but typically more recently with non-profit partners. The organization alone operates roughly 7,100 units of public housing but oversees a system of support for over 104,000 households. We suggest BC Housing adopt radon management policies, making public any testing and moving quickly to ensure mitigation to below Health Canada Guidelines. In 2015 Manitoba Housing and Renewal Corporation committed to proactively implementing a testing program to monitor levels of Radon in government housing and use the results from this randomized testing to develop policy and guide decisions about further testing and remediation.[40] Manitoba Housing's Design Guidelines for Multi-Unit Affordable and Social Housing in November 2017 to include provisions for radon control.[41]

We also suggest BC Housing promote radon awareness, testing, and mitigation with its project partners. Some such partners are already taking action. The Aboriginal Housing Society of Prince George is a not-for-profit housing provider of affordable housing for Aboriginal people. It participated in a broad radon testing program in Prince George in 2014. The housing society volunteered to test individual housing units for radon. Close to thirty percent were above the Canadian radon guideline and were subsequently mitigated.[42]

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[39] Interview with Ryan Lau, the inspector who oversaw the process, April 18, 2018

[40] Annual Report of the Department of Housing and Community Development for the Province of Manitoba for the year 2014/15.Available at http://www.gov.mb.ca/housing/pubs/2014-2015-annual-report-web.pdf accessed May 20, 2018.

[41] Manitoba Housing, 2017. Design Guidelines for Multi-Unit Affordable and Social Housing v. 1.4 Available at http://www.gov.mb.ca/housing/pubs/procurement/design-guidelines-for-multi-unit-affordable-and-social-housing.pdf accessed May 20, 2018

[42] Swoveland, B. 2016. A Model For Radon Testing and Mitigation in Affordable Housing. The Lung Association of British Columbia. available at http://www.radonaware.ca/database/files/library/BCLung_Radon_AHSCaseStudy_.pdf Accessed may 18, 2018.

Integrating Radon, Indoor Environments and Green Buildings

We stress that radon is one of a number of problematic indoor pollutants, including asbestos, ozone, formaldehyde, and volatile organic compounds. As such, addressing radon can be worked into a larger program to ensure healthy indoor environments for all BC residents, including renters.

Radon mitigation also involves building design and retrofitting, allowing for radon to be introduced as part of green building initiatives. In fact, energy efficiency and radon mitigation often go together. When builders are made 'tight' through good insulation and sealing of cracks, this can allow radon to build up. Energy efficient upgrades often need to be accompanied by radon mitigation. British Columbia has been taking steps towards a lower carbon-built environment to accomplish climate action goals, and proposals now call for a zero-carbon built environment.[43] To date, a number of initiatives explicitly link radon mitigation to sustainability initiatives and green building.

LEED is the best known 'green building' label and it stands for "Leadership in Energy and Environmental Design". Since 2004, the Canadian Green Building Council (the Canadian LEED administrator) has certified over 3,300 LEED buildings in Canada and registered over 7,800.[44] For LEED, Radon mitigation is considered an important component of Indoor Environmental Quality[45] and radon resistant construction is a prerequisite for single family houses, and multi-family mid-rises.[46]

Victoriaville is a small city in Central Quebec that has long cultivated sustainability policies (in areas of recycling and composting) gaining a reputation as the 'cradle of sustainable development.' As part of a broader sustainable buildings program— Victoria Sustainable Habitation (VSH) it has provided a system of incentives for new construction and, more recently, new regulations covering radon.[47] It works together with companies that provide

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[43] Frappé-Sénéclauze, T.-P., Heerema, D., Tam Wu, K. 2017. Deep Emissions Reduction in the Existing Building Stock: Key elements of a retrofit strategy for B.C. Pembina Institute and Real Estate Foundation of British Columbia.available at http://www.pembina.org/pub/building-retrofits accessed may 24, 2018

[44] Canada Green Building Council, 2018. LEED. https://www.cagbc.org/@/CAGBC/Programs/LEED/Going_green_with_LEE?hkey=54c44792-442b-450a-a286-4aa710bf5c64

[45] LEED v4: Reference Guide for Homes, Design and Construction. Available at https://www.usgbc.org/sites/all/assets/section/files/v4-guide-excerpts/Excerpt_v4_HOMES.pdf at p. 364

[46] LEED v4 for Homes Design and Construction Includes LEED BD +C for Multifamily Lowrise and LEED BD +C for Multifamily Midrise at https://www.usgbc.org/sites/default/files/LEED%20v4%20ballot%20version%20(Homes)%20-%2013%2011%2013.pdf accessed May 21, 2018 p. 83

[47] Cyr, S. 2018. Minimizing Exposition to Radon. Municipal Bylaws. http://www.carst.ca/resources/Conference%202018/Presentations2018/Radon%20-%20réduction%20de%20l'exposition%20(anglais)%20Victoriaville.pdf. Presented as Victoriaville-A Unique Approach to Municipal Grant Programs at CARST 2008, April 24, 2018.

technical knowledge and appraisal, such as Ecohome[48] and Hydro- Quebec's Renoclimat Program.[49] The VSH program provides for homeowners to make a series of 'gestures' that, if taken together would transform local buildings to be healthier, more energy efficient and ecological. In 2014 incentives were created to promote radon mitigation systems but replaced in 2016 will formal requirement in the local building code. VSH included a separate renovation component involving homeowner grants for building retrofits. These were available in areas of greenhouse gas emissions, and ecology, and guiding values included sustainable material use, local procurement, reduced water consumption; improved waste management, universal accessibility, and air quality.[50] After 2013 radon was included as an "eco-action" which would be subsidized.

In Conclusion

Radon is the highest priority carcinogenic exposure for indoor air in Canada.[51] Reducing radon in homes will help prevent lung cancer for current and future generations. Once radon reduction system is installed, it will reduce radon for all future occupants.

Social equity principles demand that renters' health be considered on par with those of homeowners. Residential tenancies law has long protected renters and sought to alleviate power imbalances between renters and owners. We feel it is incumbent to use this law to protect renters from cancer risks which are no fault of their own. We feel that, British Columbia should be aiming to ensure all buildings, including rental accommodation, have low radon concentrations, and combining radon mitigation with other broad measures to ensure sustainability principles in the built environment.

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