

Canadian research round-up

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CARST Conference 2019

Saskatoon, Saskatchewan



SIMON FRASER UNIVERSITY
ENGAGING THE WORLD



Overview

- Lending library programs
 - What are they and how do they work?
- Energy Efficiency literature review
- Recent Canadian publications

“Lending Library” programs



Libraries lend digital devices (Corentium Homes) to patrons for free

Devices has barcode and come in a tub includes print materials, instructions, etc.

Recommendations for long term testing

Concept (first known?) piloted in Oslo



- Two libraries- 10 detectors (Airthings) In conjunction with Cancer Society
- 62 people tested in pilot
- Librarians were pleased with the project, got many questions
- Program very popular, line-ups for get detectors

Nova Scotia- Halifax

- Health Canada/Lung Association supported program
- Provincial Department of environment involved
- 1,100 people signed up
- Still considerable wait-list still

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What we learned, what you said about doctor shortage in Atlantic Canada

Challenges, solutions to Atlantic Canada's doctor shortage

Family doctor shortage a threat to health care

More radon detector kits coming to local libraries

Nova Scotia

Radon detectors in high demand at Nova Scotia libraries



More than 1,100 people signed up to check out radon detectors from libraries

Anjuli Patil - CBC News · Posted: Nov 21, 2018 5:01 PM AT | Last Updated: November 21, 2018



Radon detectors available to check out from Nova Scotia libraries

One of the most highly sought after items at Nova Scotia libraries

The libraries, along with the Lung Association of Nova Scotia, are offering radon detectors to help people detect the radioactive gas, which is known to cause lung cancer. In Halifax alone, there are still about 560 people on the waitlist.

"The program has been exceptionally popular. The library special collections ever," Michelle Donaldson, a spokesperson for the Lung Association of Nova Scotia, told CBC Radio's *Maritime Noon*.

"We are very pleased that radon is becoming more of a topic people are aware of, that people know that they have to test their homes in order to keep their families safe," Donaldson said.



Michelle Donaldson, a spokesperson for the Lung Association of Nova Scotia, holding a radon detector. (Carolyn Ray/CBC)

Donaldson said radon is the second leading cause of lung cancer in Nova Scotia and the leading cause of lung cancer in Nova Scotia for non-smokers. She said 120 cases of lung cancer in Nova Scotia last year were attributed to radon gas.

The devices available for rent at the library are not intended to replace long-term detectors, which the association sells for \$40, Donaldson said.

Sea to Sky Corridor in BC

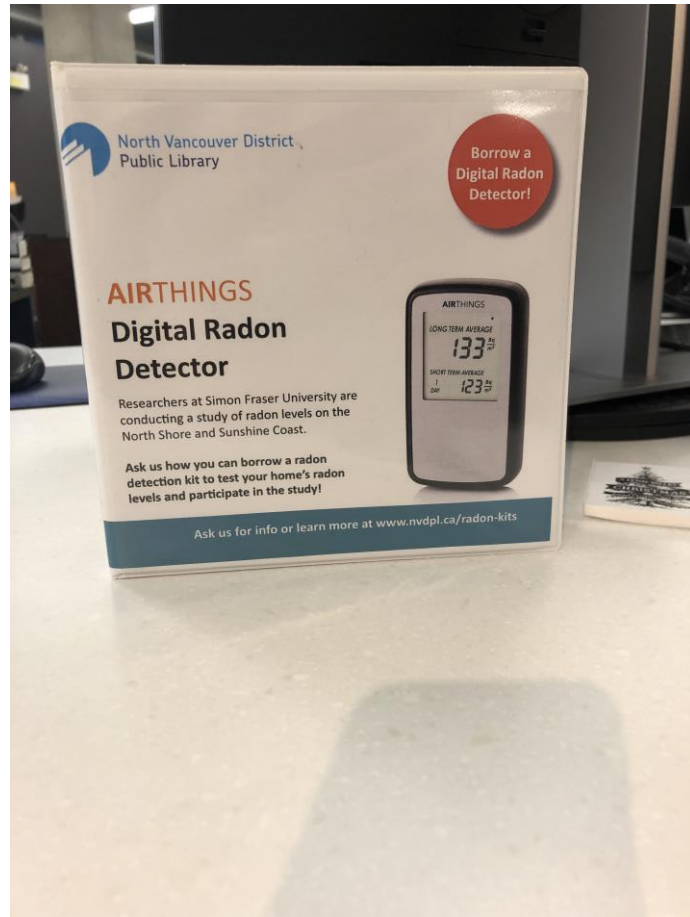
- North Vancouver to Pemberton
- BC Lung/Health Canada/Simon Fraser University /Airthings
- 50 detectors deployed
 - Wait list happened almost immediately
- Include a survey for patrons



Library Lending “Tubs” for loan



North Shore of Vancouver- promotion



Main findings

- Librarians are fantastic places to promote radon
- librarians promoted the testing
- Were able to do in-library programming during Radon Action Month (BC Lung)
- Lots of questions from patrons
- Biggest issue is how to get more detectors into more libraries



Castlegar library offering free radon detectors

Radon is the second-leading cause of lung cancer and Castlegar has one of the highest levels in B.C.

[BETSY KLINE](#) / Nov. 16, 2018 10:30 a.m. / [LOCAL NEWS](#) / [NEWS](#)



The Castlegar and District Public Library is offering free radon detectors to local residents.

The Donna Schmidt Lung Cancer Prevention Society (DSLCPs) donated 10 electronic radon detectors to the library, which can be checked out for up to six weeks, but only require three to 10 days of exposure to give a reading.

Radon is the second leading cause of lung cancer and Castlegar has one of the highest concentrations of it in the province.

RELATED: [More than half of tested homes in Castlegar exceed radon threshold](#)

College libraries interested too!



More libraries coming on board...

Moving on...



Energy efficiency initiatives and radon levels

SFU MPH literature review- Brar
Databases in health, engineering
and building sciences

Key terms “radon”, “energy
efficiency” and “indoor air
quality”.

Factors: year, region, methods,
key variables



Results

Country	# of Articles	Type of Study
Canada (AB)	1	Building measurement
UK	3	Modeling designs
Austria	1	Building measurement
Russian	4	Building measurement
Finland	1	Modeling designs
Czech Republic	1	Building measurement
France	2	Both
Romania	1	Building measurement
Switzerland	1	Building measurement

Key findings

- Modeled design factors and measured residences shows that EE initiatives can increase radon levels
 - In some cases increases are dramatic
- Parameters that result in more airtight buildings are suggested to be the main drivers of this phenomenon



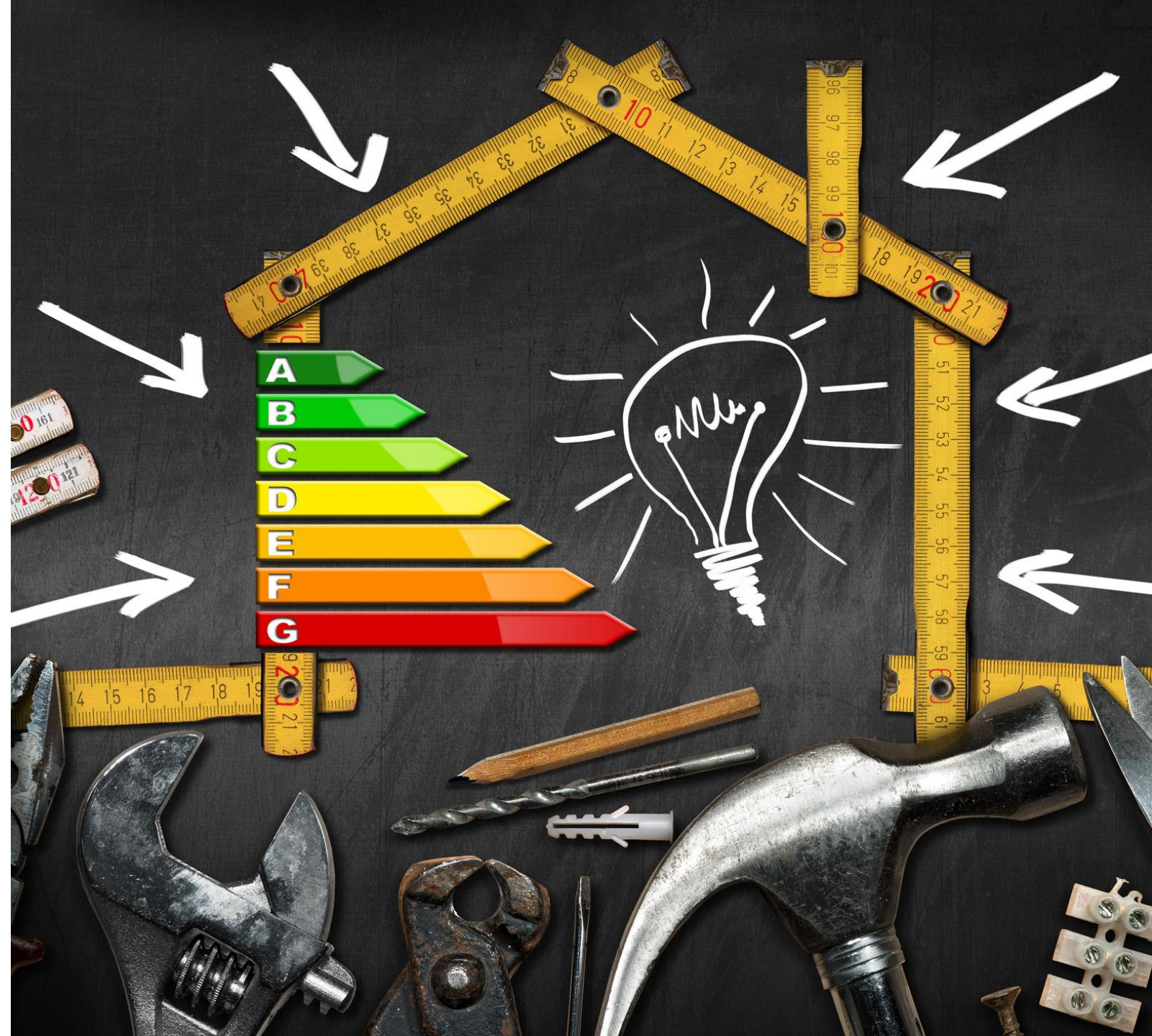
Ventilation seems key

- Houses with natural ventilation and those that lack extract fans were most vulnerable to radon increases.
- Mechanical, purpose-built ventilation that reduces the pressure differential between indoor and outdoor air correlated with the lowest radon levels.



Does age of home matter?

- New homes as well as renovated homes (energy retrofitted) showed increases in radon levels.
- Levels of radon were increased after EE changes in both single and multi-level buildings



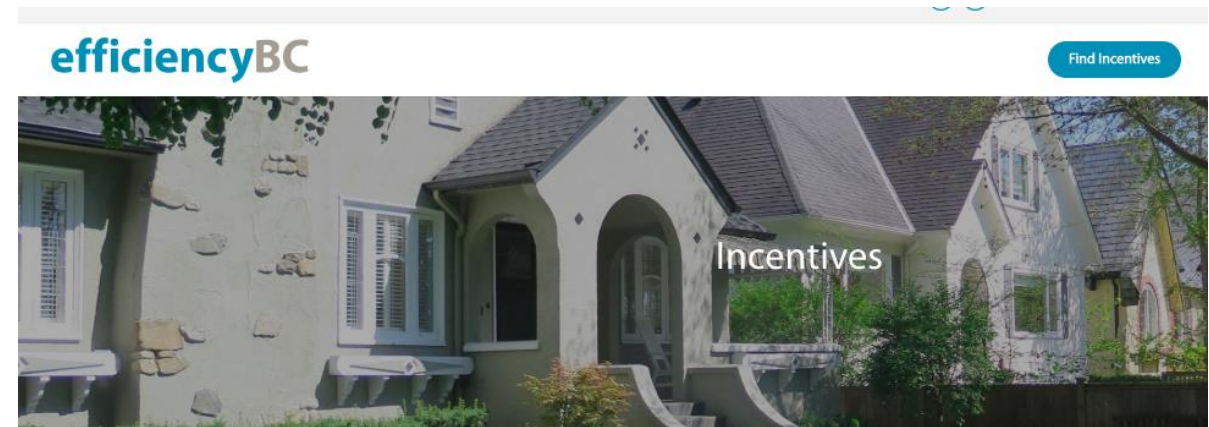
Air conditioning impacts

- Only a few studies investigated
- Air conditioning *renovations* may increase radon levels
- More scrutiny needed



Limitations and conclusions of review

- Most research done in Europe
 - Applicability to North American housing stock maybe limited
- More *published* studies would be useful
- Tightening homes without consideration for ventilation or addition of radon systems
- Energy efficiency programs are growing in popularity and attention to radon is warranted



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Other recent Canadian publications

Radiat Prot Dosimetry, 2019 Apr 29. pii: ncz068. doi: 10.1093/rpd/ncz068. [Epub ahead of print]

DOMESTIC RADON EXPOSURE AND CHILDHOOD LEUKAEMIA AND LYMPHOMA: A POPULATION-BASED STUDY IN CANADA.

Chen J¹, Xie L².

Radiat Prot Dosimetry, 2019 Mar 31. pii: ncz035. doi: 10.1093/rpd/ncz035. [Epub ahead of print]

A DISCUSSION ON ISSUES WITH RADON IN DRINKING WATER.

Chen J¹.

Recent Canadian publications

1: Chen J, Xie L. DOMESTIC RADON EXPOSURE AND CHILDHOOD LEUKAEMIA AND LYMPHOMA: A POPULATION-BASED STUDY IN CANADA. *Radiat Prot Dosimetry*. 2019 Apr 29. pii: ncz068. doi: 10.1093/rpd/ncz068. [Epub ahead of print] PubMed PMID: 31034559.

2: Khan SM, Krewski D, Gomes J, Deonandan R. Radon, an invisible killer in Canadian homes: perceptions of Ottawa-Gatineau residents. *Can J Public Health*. 2019 Apr;110(2):139-148. doi: 10.17269/s41997-018-0151-5. Epub 2018 Nov 19. PubMed PMID: 30456743.

3: Chen J. A DISCUSSION ON ISSUES WITH RADON IN DRINKING WATER. *Radiat Prot Dosimetry*. 2019 Mar 31. pii: ncz035. doi: 10.1093/rpd/ncz035. [Epub ahead of print] PubMed PMID: 30929000.

4: Whyte J, Falcomer R, Chen J. A Comparative Study of Radon Levels in Federal Buildings and Residential Homes in Canada. *Health Phys*. 2019 Mar 25. doi: 10.1097/HP.0000000000001057. [Epub ahead of print] PubMed PMID: 30913059.

5: Navaranjan G, Chambers D, Thompson PA, Do M, Berriault C, Villeneuve PJ, Demers PA. Uncertainties associated with assessing Ontario uranium miners' exposure to radon daughters. *J Radiol Prot*. 2019 Mar;39(1):136-149. doi: 10.1088/1361-6498/aaf1eb. Epub 2018 Nov 19. PubMed PMID: 30524032.

6: Chen J. RISK ASSESSMENT FOR RADON EXPOSURE IN VARIOUS INDOOR ENVIRONMENTS. *Radiat Prot Dosimetry*. 2019 Jan 9. doi: 10.1093/rpd/ncy284. [Epub ahead of print] PubMed PMID: 30624757.

Selected 2017-18 studies

1: Al-Arydah M. Estimating the burden of lung cancer and the efficiency of home radon mitigation systems in some Canadian provinces. *Sci Total Environ.* 2018 Jun 1;626:287-306. doi: 10.1016/j.scitotenv.2018.01.028. Epub 2018 Feb 19. PubMed PMID: 29353778.

2: Gaskin J, Coyle D, Whyte J, Krewski D. Utility gains from reductions in the modifiable burden of lung cancer attributable to residential radon in Canada. *Can J Public Health.* 2018 Aug;109(4):598-609. doi: 10.17269/s41997-018-0119-5. Epub 2018 Sep 27. PubMed PMID: 30264193.

3: Chen J. COMPARATIVE STUDY OF RADON EXPOSURE IN CANADIAN HOMES AND URANIUM MINES-A DISCUSSION ON THE IMPORTANCE OF NATIONAL RADON PROGRAM. *Radiat Prot Dosimetry.* 2017 Nov 1;177(1-2):83-86. doi: 10.1093/rpd/ncx132. PubMed PMID: 28981856.

4: Chen J. CANADIAN POPULATION RISK OF RADON INDUCED LUNG CANCER-VARIATION RANGE ASSESSMENT BASED ON VARIOUS RADON RISK MODELS. *Radiat Prot Dosimetry.* 2017 Nov 1;177(1-2):63-68. doi: 10.1093/rpd/ncx133. PubMed PMID: 28981841.

5: Stanley FK, Zarezadeh S, Dumais CD, Dumais K, MacQueen R, Clement F, Goodarzi AA. Comprehensive survey of household radon gas levels and risk factors in southern Alberta. *CMAJ Open.* 2017 Mar 28;5(1):E255-E264. doi: 10.9778/cmajo.20160142. eCollection 2017 Jan-Mar. PubMed PMID: 28401142; PubMed Central PMCID: PMC5378506.

RISK ASSESSMENT FOR RADON EXPOSURE IN VARIOUS INDOOR ENVIRONMENTS


Jing Chen 

Radiation Protection Dosimetry, ncy284, <https://doi.org/10.1093/rpd/ncy284>

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Abstract

Using data from a number of radon surveys, it was assessed that on average, radon progeny concentrations in Canadian homes are about three times higher than in school buildings, 4.7 times higher than in public buildings and indoor workplaces, and 12 times higher than in outdoor air. Canadian statistics show that most Canadians spend ~70% of their time indoors at home, 20% indoors away from home and 10% in outdoors. Due to relatively higher radon concentration in residential homes and longer time spent indoors at home, the exposure at home contributes to 90% of the radon-induced lung-cancer risk.