

TAKE  
ACTION ON RADON



## Take Action on Radon

### 100 Radon Test Kit Challenge: Preliminary Data Report

Released: November 2021



Take Action on Radon is a national initiative, funded by Health Canada, to bring together radon stakeholders and raise radon awareness across Canada.

### About the Take Action on Radon Program

Take Action on Radon (TAOR) is a national initiative, funded by Health Canada, to bring together radon stakeholders and raise radon awareness across Canada.

The current advisory team is made up of the Canadian Association of Radon Scientists and Technologists (CARST), CAREX Canada, and the Canadian Cancer Society.

The success of this initiative hinges on the participation and dedication of hundreds of radon stakeholders coast to coast. From radon professionals and community champions to radon researchers, public health officials, and programs at the municipal, provincial, and federal levels: radon awareness is a team effort.



Canadian Cancer Society / Société canadienne du cancer



The 100 Radon Test Kit Challenge is designed to engage and support communities in distributing radon test kits; gathering radon data and spreading radon awareness.

## About the 100 Radon Test Kit Challenge Program

The 100 Radon Test Kit Challenge program takes a Citizen Science approach to gathering data on radon levels. A turn-key program, it was designed to engage and support communities in distributing radon test kits to their residents while gathering data and spreading radon awareness. Participating communities receive a toolkit of resources, and the support of the Take Action on Radon team through each step of the program. The number of participating communities has increased each year, as listed below:



• **2018-2019 Communities**      **2019 – 2020 Communities**

- |                     |                        |
|---------------------|------------------------|
| • Moncton, NB       | Halifax, NS            |
| • Salmon Arm, BC    | Sherbrooke, QC         |
| • Winnipeg, MB      | Brandon, MB            |
| • Spruce Grove, AB  | Dauphin, MB            |
| • Golden, BC        | Greater Madawaska , ON |
| • Souris, MB        | Summerland, BC         |
| • Port Colborne, ON | Valemount, BC          |
| • Baden, ON         | Coquitlam, BC          |
| • Wabana, NL        | Abbotsford, BC         |
|                     | McBride, BC            |
|                     | Vaudreuil-Dorion, QC   |
|                     | Pembroke, ON           |
|                     | Harrison Park, MB      |
|                     | North Grenville, ON    |

**2020 – 2021 Communities**

- Sicamous, BC
- Peachland, BC
- West Bank First Nation, BC
- West Kelowna, BC
- Kelowna, BC
- Vernon, BC
- Lake Country, BC
- Sundre, AB
- Black Diamond, AB
- Eston, SK
- Silver Harbour, MB
- Lakeshore, MB
- Chatham-Kent, ON
- Leeds & Thousand Islands, ON
- Carleton-sur-mer, QC
- Saint-Joseph du-Lac, QC
- Lorraine, QC
- Candiac, QC (continued in 2021)
- Madawaska, NB
- Mount Pearl, NL
- Stephenville, NL

In the first three years of the 100 Radon Test Kit Challenge, over 5500 test kits have been distributed.

### Impact to date

- *3 years*
- *Over 40 communities*
- *Over 5 500 kits distributed*

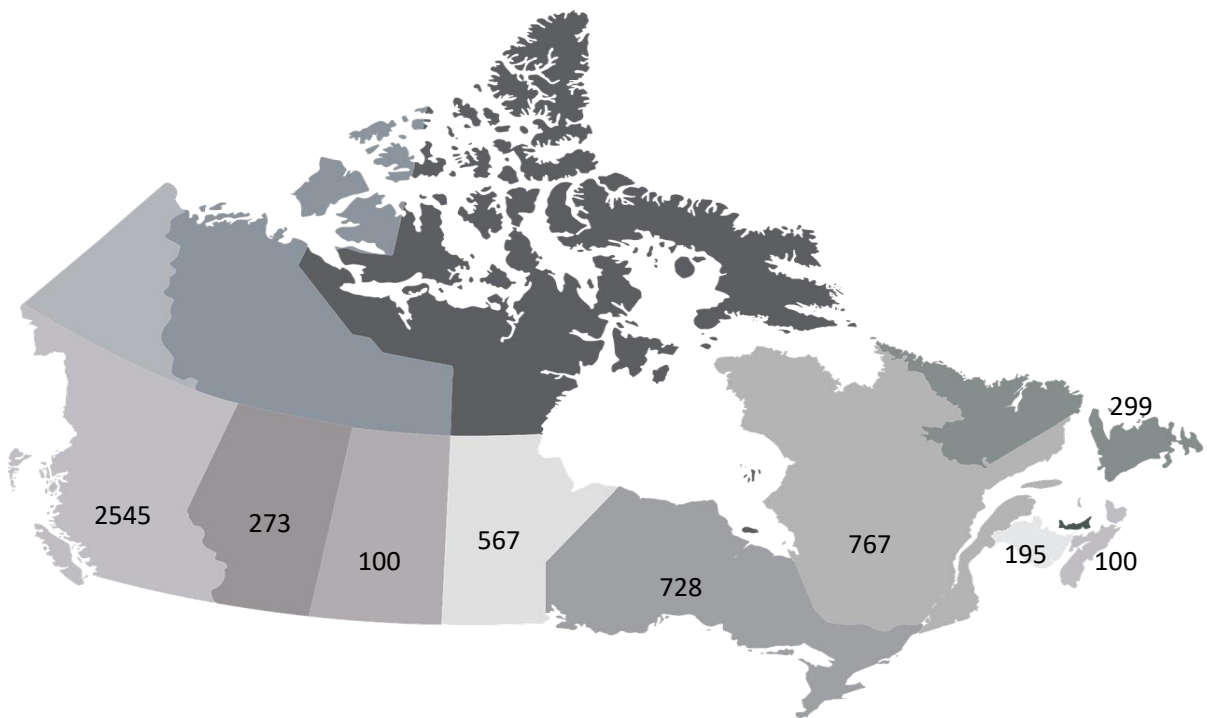


Figure 1: Distribution of test kits by province from 2018 - 2021.



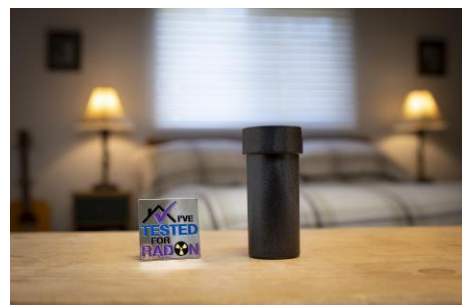
Health Canada's 2012 Cross-Canada Survey of Radon Concentrations in Homes has been used as the standard reference since it was first published.

## Existing radon data in Canada

When discussing the incidence of high radon levels in Canada, Health Canada's 2012 Cross-Canada Survey of Radon Concentrations in Homes<sup>1</sup> (Cross-Canada Radon Survey) has been used as the standard reference since it was first published. This survey, which distributed over 14 000 radon detectors across the country, aimed to collect data from all areas of the country and provide an initial estimate of the extent of the radon problem in Canada.

This ambitious study collected data from all regions of Canada, and provincial averages were calculated based on the results of the testing. The calculated percentages varied extensively by province, as illustrated in Table 1.

Health Canada also calculated a population-weighted average for each province, to estimate the percentage of Canadians in each province living in homes where the indoor radon levels exceed Canada's guideline level of 200 Bq/m<sup>3</sup>.





Health Canada calculated population-weighted averages for each province, as well as a national average.

Table 1: Data from the Cross Canada Radon Survey

Province/Territory	Number of Homes tested	% of Homes that tested above 200 Bq/m <sup>3</sup> (raw data)	Population Weighted Average
Alberta (AB)	1 166	6.6	5.7
British Columbia (BC)	1 878	7.9	3.9
Manitoba (MB)	1 202	23.7	19.4
New Brunswick (NB)	839	24.8	20.6
Newfoundland and Labrador (NL)	684	5.9	5.1
Nova Scotia (NS)	595	8.8	10.7
Northwest Territories (NT)	192	5.4	5.4
Nunavut (NU)	85	0.0	0.0
Ontario (ON)	3 891	8.2	4.6
Prince Edward Island (PE)	116	3.5	3.5
Quebec (QC)	1 849	10.1	8.2
Saskatchewan (SK)	1 251	16.3	15.7
Yukon (YK)	228	19.6	19.6
<b>Total</b>	<b>13 976</b>		<b>6.9</b>



The 100 Radon Test Kit Challenge has collected radon data in 43 communities, and the results, especially when compared to the existing data, are striking.

## Methods

Take Action on Radon collated results from 100 Test Kit Challenge program measured between 2018 and 2021. All testing was undertaken for 3 months over the winter heating periods. The test kits used for this work were C-NRPP listed devices from Accustar (Year1), Radonova (Year2) and the Saskatchewan Research Council (Year 3). All forms of housing were eligible to test in this program, including multi-unit residential buildings, duplexes and townhomes and no restrictions were placed on the age of the homes.

Quality Assurance practices established by the Canadian National Radon Proficiency Program (C-NRPP)<sup>2</sup> were included in the process of testing including spikes sent to the chamber, duplicates for 10% of the tests and blanks for 5%. Because the duplicates require homeowners to follow good process, instructions were clearly provided in the instructions as well as in the Radon Information Session and they were followed up after the results were received.

Data for communities were organized by province. The percentage of homes above the guideline was calculated using the raw number of homes testing above 200 Bq/m<sup>3</sup> divided by all homes tested in that community. The definition of community was self-identified geographically by the “Community Liaison” who lead each testing initiative at the local level.

In this report the percentage of homes with results above the Government of Canada guideline was compared to Health Canada’s 2012 calculated provincial averages for each community. The results are presented by province, with communities plotted against the calculated province average. Graphics were prepared for this report for each province in which 3 or more communities had undertaken the 100 Test Kit Challenge.

More than half the participating communities have been found to have over 30% of homes with radon levels above the Canadian guideline level.

### Results : National

Health Canada estimates that 7% of Canadian homes have radon levels above the national guideline level.

Figure 1 shows the results from all 43 communities in Canada that have taken part in the 100 Radon Test Kit Challenge, as compared to Health Canada’s national estimate.

The majority of communities exceed Health Canada’s national estimate of 7%, with up to 79% of homes having tested above the guideline. Of the 43 communities tested, 39 communities are at or above the Health Canada national estimate.

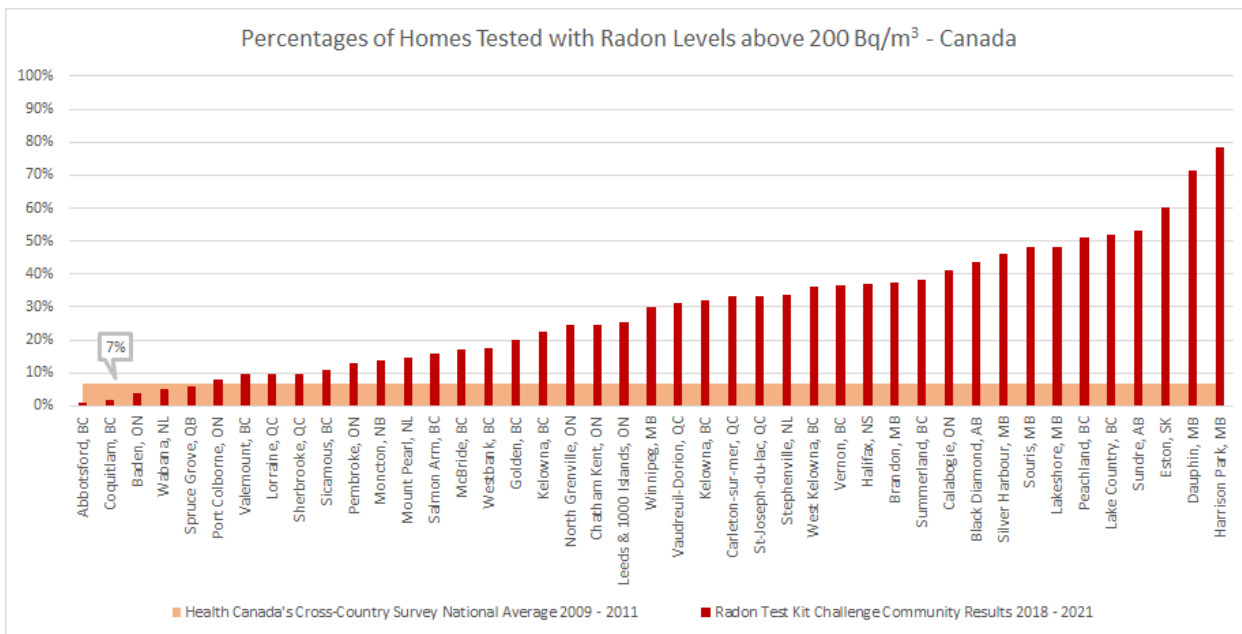


Figure 2: Canada-wide testing results from the 100 Radon Test Kit Challenge



Table 2 presents the data from each of the 100 Radon Test Kit Challenge communities.

Province or Territory	Community	Year(s) testing period	Number homes tested	Percent of homes above 200 Bq/m <sup>3</sup>	Source
BC	Abbotsford	2019-20	82	1%	<a href="#">PDF Report</a>
	Coquitlam	2019-20	113	2%	<a href="#">PDF Report</a>
	Golden	2019	81	20%	<a href="#">PDF Report</a>
	City of Kelowna	2020-21	573	23%	<a href="#">PDF Report</a>
	Lake Country	2020-21	214	52%	<a href="#">PDF Report</a>
	McBride	2019-20	41	17%	<a href="#">PDF Report</a>
	Peachland	2020-21	39	51%	<a href="#">PDF Report</a>
	Salmon Arm & Shuswap	2019	168	16%	<a href="#">PDF Report</a>
	Sicamous	2020-21	46	11%	<a href="#">PDF Report</a>
	Summerland	2019-20	94	38%	<a href="#">PDF Report</a>
	Valemount	2019-20	62	10%	<a href="#">PDF Report</a>
AB	Spruce Grove	2019	68	6%	<a href="#">PDF Report</a>
	Black Diamond	2020-21	71	44%	<a href="#">PDF Report</a>
	Sundre	2020-21	122	53%	<a href="#">PDF Report</a>
SK	Eston	2020-21	85	60%	<a href="#">PDF Report</a>

Table 2: Summary of Radon Test Results by community from 2018 - 2021

Province, Territory	Community	Year(s) testing period	Percent of homes above 200 Bq/m <sup>3</sup>	Number homes tested	Source
MB	Brandon	2019-20	37%	75	<a href="#">PDF Report</a>
	Dauphin	2019-20	71%	87	<a href="#">PDF Report</a>
	Harrison Park	2019-20	78%	55	<a href="#">PDF Report</a>
	Souris	2019	48%	100	<a href="#">PDF Report</a>
	Winnipeg	2019	30%	90	<a href="#">PDF Report</a>
	Silver Harbour	2020-21	46%	37	<a href="#">PDF Report</a>
	Lakeshore	2020-21	48%	50	<a href="#">PDF Report</a>
ON	Baden & Wilmot	2019	4%	78	<a href="#">PDF Report</a>
	Greater Madawaska	2019-20	41%	83	<a href="#">PDF Report</a>
	North Grenville	2019-20	24%	90	<a href="#">PDF Report</a>
	Port Colborne	2019-20	8%	93	<a href="#">PDF Report</a>
	Renfrew County	2019-20	13%	69	<a href="#">PDF Report</a>
	Chatham-Kent	2020-21	18%	125	<a href="#">PDF Report</a>
	Leeds and the 1000 Islands	2020-21	24%	75	<a href="#">PDF Report</a>
QB	Carleton-Sur-Mer	2020-21	33%	90	<a href="#">PDF Report</a>
	Saint-Joseph-du-Lac	2020-21	33%	186	<a href="#">PDF Report</a>
	Sherbrooke	2019-20	10%	92	<a href="#">PDF Report</a>
	Vaudreuil-Dorion	2019-20	31%	74	<a href="#">PDF Report</a>
NB	Moncton	2019	14%	94	<a href="#">PDF Report</a>
NFLD	Wabana	2019	5%	100	<a href="#">PDF Report</a>
	Mount Pearl	2020-21	15%	89	<a href="#">PDF Report</a>
	Stephenville	2020-21	34%	65	<a href="#">PDF Report</a>
NS	Halifax	2019-20	37%	76	<a href="#">PDF Report</a>

Table 2 (continued): Summary of Radon Test Results by community from 2018 - 2021

**Results : Provincial**

British Columbia (BC)

Health Canada’s radon survey calculated that 7.9% of homes in BC were above the Canadian guideline (200 Bq/m<sup>3</sup>)

The 100 Radon Test Kit Challenge found that all but two communities tested exceeded Health Canada’s BC estimate. At the most extreme were Peachland and Lake Country, where more than 50% of homes tested above the Canadian guideline.

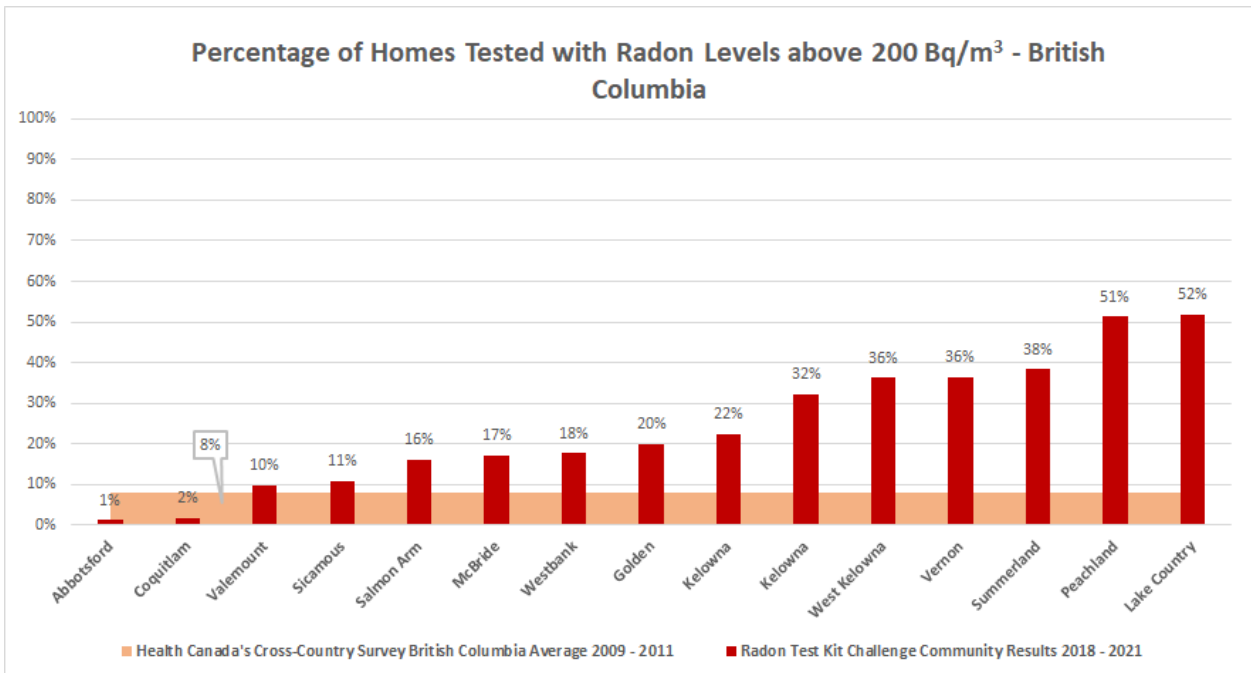


Figure 3: British Columbia

Alberta  
community survey  
results ranged  
from 6 to 53%.

Alberta (AB)

Health Canada’s radon survey calculated that 6.6% of homes in Alberta were above the Canadian guideline.

The 100 Radon Test Kit Challenge found that two of the three communities tested were above the provincial average. The community with the greatest number of homes above the guideline had 53% of homes test over 200 Bq/m<sup>3</sup>.

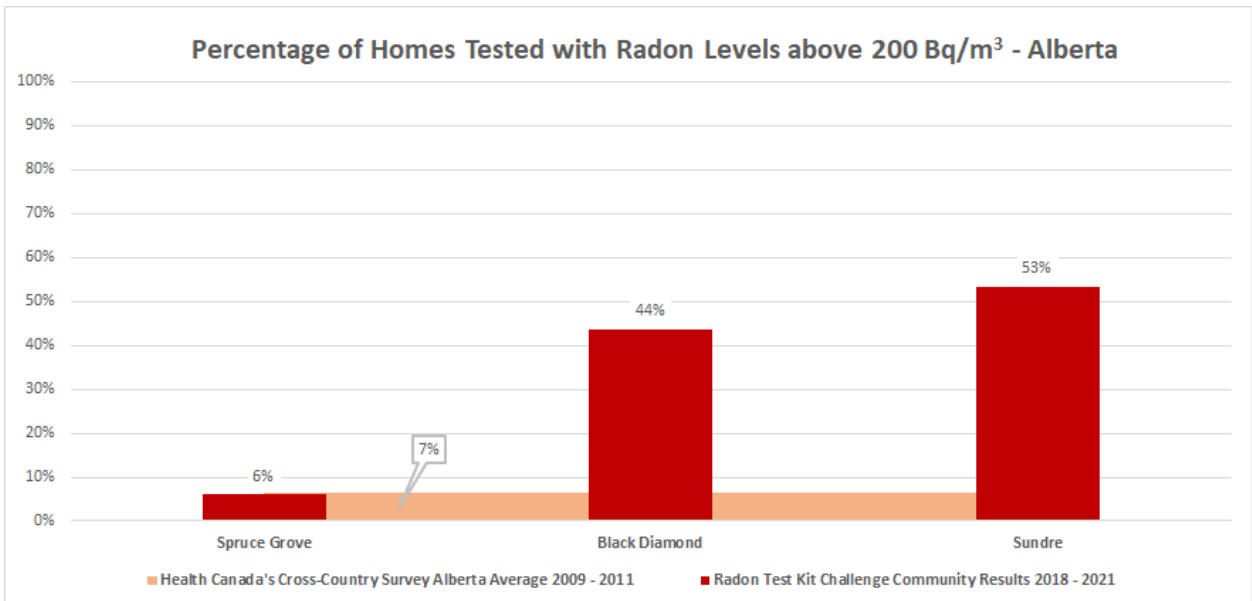


Figure 4: Alberta

Manitoba (MB)

Health Canada’s radon survey calculated that 23.7% of homes in Manitoba were above the Canadian guideline level. Along with New Brunswick, this province had the highest incidence of homes above the guideline in Health Canada’s survey.

100 Radon Test Kit challenge found that all communities tested exceeded Health Canada’s Manitoba estimate. The community with the greatest percentage of homes above the guideline was Harrison Park, where 79% of homes tested over 200 Bq/m<sup>3</sup>.

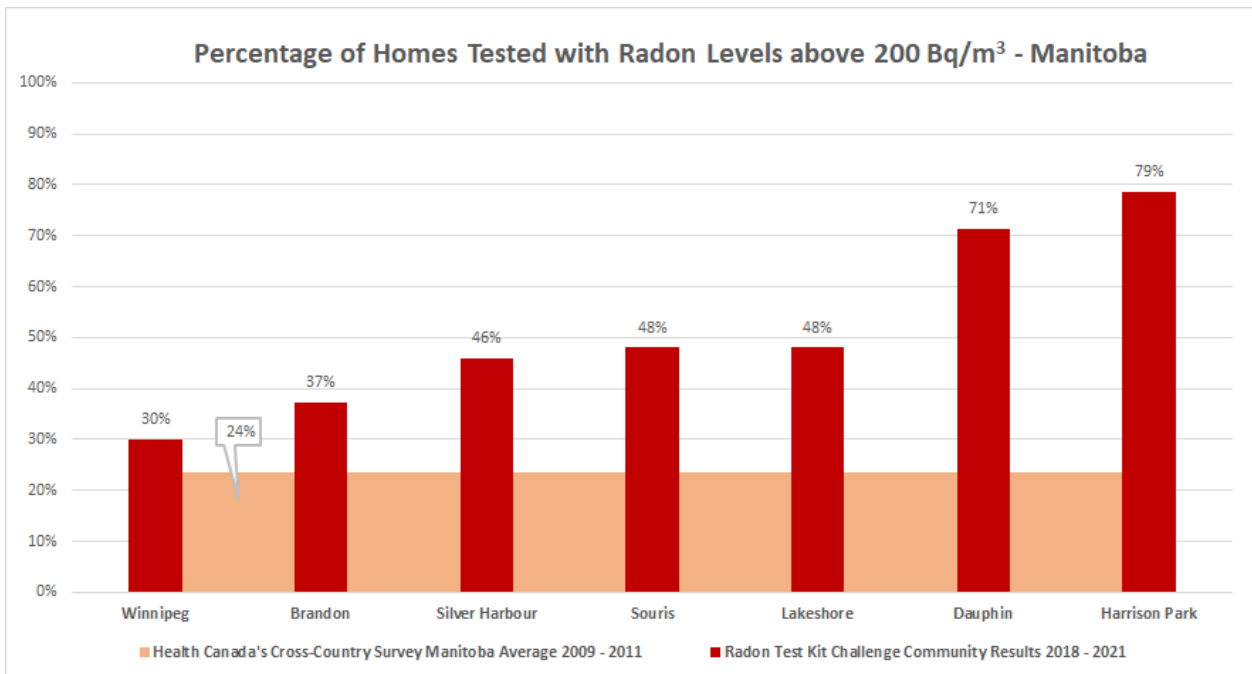


Figure 5: Manitoba

## Ontario (ON)

Health Canada’s 2012 radon survey calculated that 8.2% of homes in Ontario were above the Canadian guideline (200 Bq/m<sup>3</sup>).

The 100 Radon Test Kit challenge found five out of the seven participating communities exceeded Health Canada’s Ontario estimate. The community with the greatest percentage of homes above the guideline was Calabogie, where 41% of homes tested over 200 Bq/m<sup>3</sup>.

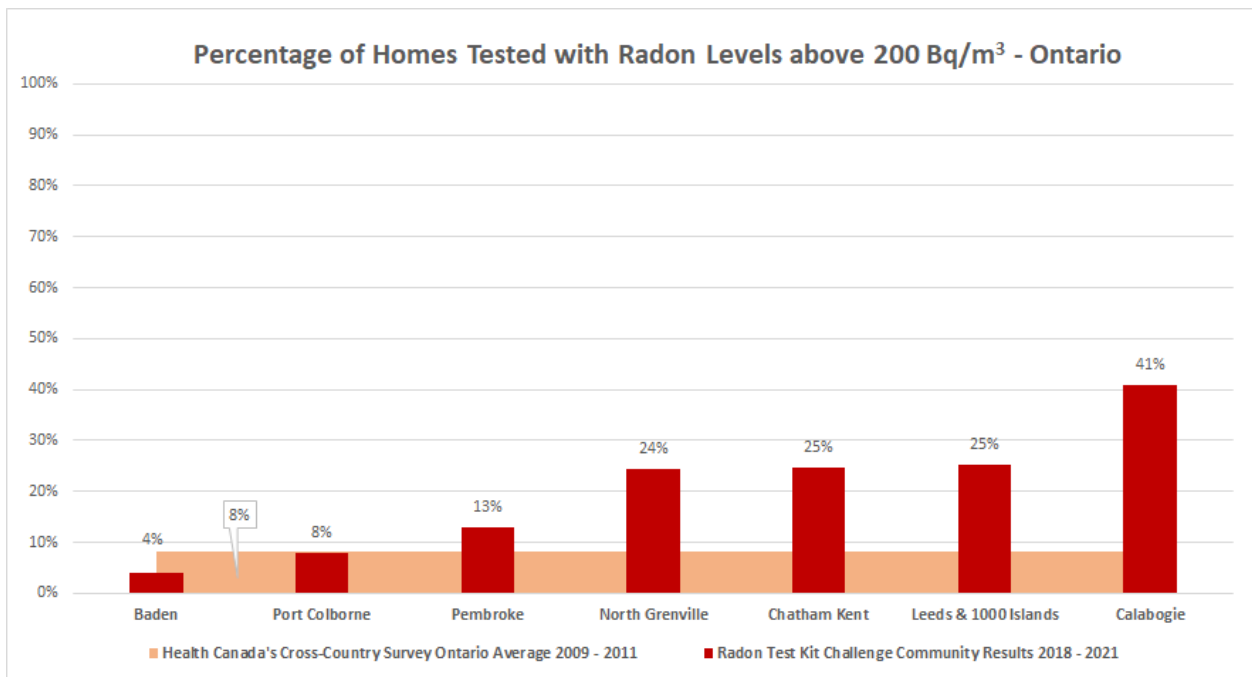


Figure 6: Ontario

Quebec community survey results ranged from 10 to 32%.

Québec (QC)

Health Canada’s 2012 radon survey calculated that 10.1% of homes in Quebec were above the Canadian guideline.

The 100 Radon Test Kit challenge found 3 out of 5 communities exceeded Health Canada’s Quebec estimate. Two communities: Carleton-sur-Mer and Saint-Joseph-du-Lac, had 33% of homes that tested over 200 Bq/m<sup>3</sup>.

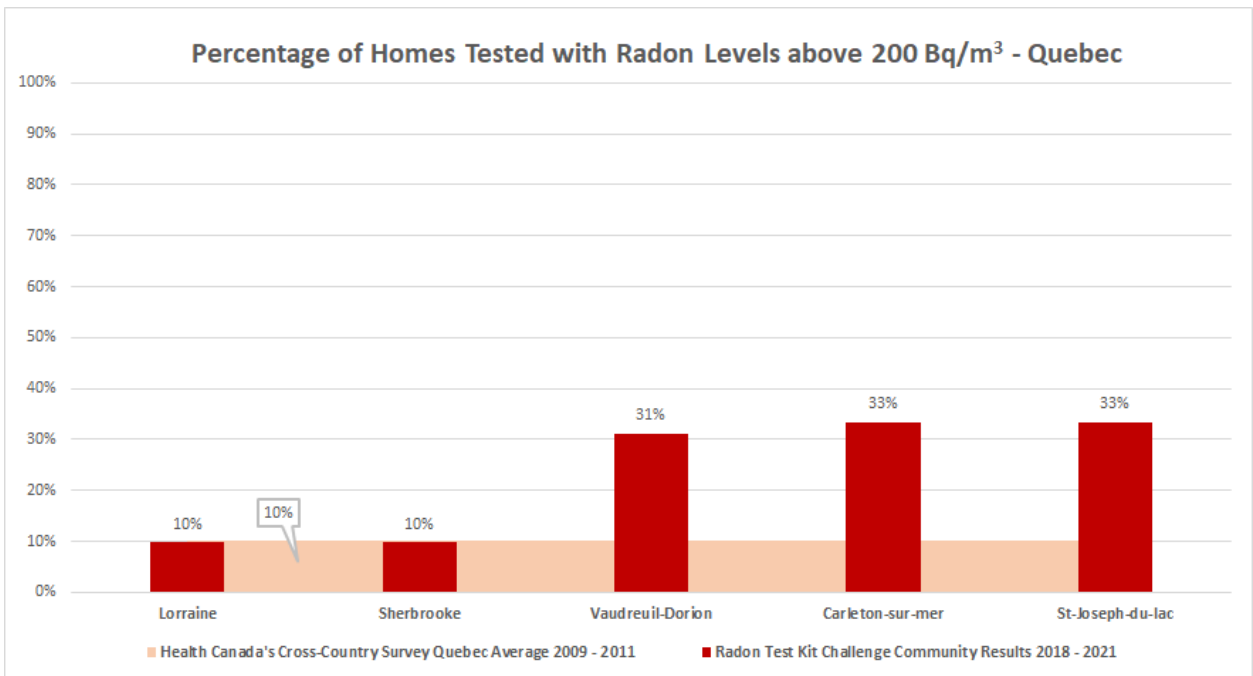


Figure 7: Quebec

Newfoundland and Labrador community survey results ranged from 5 to 34%.

Newfoundland and Labrador (NL)

Health Canada’s radon survey calculated that 6% of homes in Newfoundland and Labrador were above the Canadian guideline.

The 100 Radon Test Kit Challenge found that two of the three communities exceeded Health Canada’s Newfoundland estimate. The community with the greatest number of homes above the guideline was Stephenville, where 34% of homes tested over 200 Bq/m<sup>3</sup>.

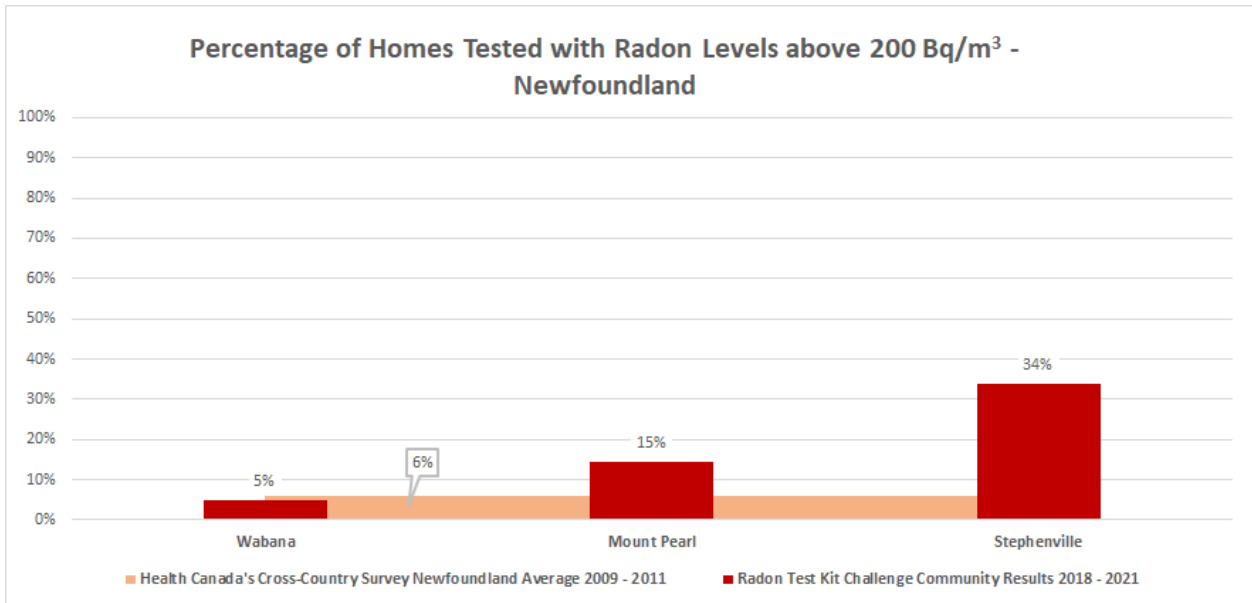


Figure 8: Newfoundland and Labrador





## Conclusion

In reviewing the results of the community testing programs, it becomes increasingly clear that while the provincial averages currently quoted from Health Canada may be accurate for some communities in each province, the large variance in the incidence of high radon levels within each province likely renders the entire concept of a provincial average next to useless for most purposes.

Further, the vast majority of communities that have participated in the community testing program have found a much higher incidence of elevated radon levels than the provincial averages would suggest. By persisting to quote provincial averages when talking about radon, experts are likely to inadvertently mislead many Canadians to believe the problem is less extensive than it actually is.

The Take Action on Radon program isn't the only community projects who have found this, we have listed some additional community radon surveys in Appendix A.

The takeaway message for policy makers may be that quoting provincial averages is unlikely to be helpful to the average Canadian citizen; on the contrary, it may in fact be harmful. If provincial averages are still deemed to be a helpful measure, then at the very least it would appear to be time to re-investigate those numbers.

The takeaway message for any given community? There is no replacement for actual testing within their regional borders. Referring to the provincial average in order to decide whether radon deserves additional attention is not a valid approach.

Ultimately, for Canadian homeowners - no matter the region - the key message remains the same: test your home for radon. No matter the incidence of high radon levels in a given community or province, the only way to know the radon level in your own home is to test it.

Table 3: Published Residential Radon Surveys by Province/Territory, 2010-2020

This is a summary of community-level residential radon testing results and does not include Health Canada’s 2012 cross-country survey.

Note: without a central data agency, this list may not be exhaustive as it does not capture independent residential testing, or unpublished results.

Province, Territory	Community	Year(s) testing period	Number homes tested	Percent of homes above 200 Bq/m <sup>3</sup>	Source
BC	Castlegar	2014	158	59	<a href="#">News;</a> <a href="#">Presentation</a>
	Prince George	2014	1,436	29	<a href="#">PDF Report</a>
	First Nations Communities - Interior	2015-2017	91	15	<a href="#">Presentation</a>
AB	<u>Province-Wide</u>	2010-18	9,507	14	<a href="#">PDF Report</a>  <a href="#">Organization Website</a>
	• Edmonton		909	16	
	• Calgary		6,366	13	
	• Southern region		1,292	19	
	• North & Central Regions		940	15	
SK	<u>Province-Wide</u>	2010-18	1,874	35	<a href="#">PDF Report;</a>  <a href="#">Organization Website</a>
	• Saskatoon		538	17	
	• Regina		493	50	
	• Rural & Small Towns		845	37	
ON	Hamilton	2019	294	14.3	<a href="#">News</a>
	Kingston, Frontenac, Lennox & Addington	2018-19	1,047	21	<a href="#">PDF Report</a>
	Marathon	2017-18	110	17	<a href="#">PDF Report</a>
	Oliver Paipoonge	2017-18	188	65	<a href="#">PDF Report</a>
	Thunder Bay	2014-15	468	16	<a href="#">PDF Report</a>
	Windsor Essex	2015-18	2,364	11	<a href="#">PDF Report</a>
	York Region	2017/18	474	0.2	<a href="#">PDF Report</a>
YK	Yukon Territory has an interactive map of aggregate results where radon testing occurred, but does not disclose the number of tests per area or testing timeframe.				<a href="#">Map</a>



## References:

1. *Cross-Canada Survey of Radon Concentrations in Homes Final Report*, Health Canada. (2012, March). <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/cross-canada-survey-radon-concentrations-homes-final-report-health-canada-2012.html>
2. *C-NRPP Quality Control and Quality Assurance Manual for Radon Sampling and Analysis conducted by Radon Measurement Professionals and Laboratories*, C-NRPP <https://c-nrpp.ca/about-qaqc/>

## More information is available:

Take Action on Radon – <https://takeactiononradon.ca/>

Government of Canada. (2019, September). [Radon: Health effects - Canada.ca](https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/government-canada-radon-guideline.html)

Government of Canada. (2014). *Radon – Another Reason to Quit*. Pub: 140043; Cat: H128-1/11-648-1E-PDF; [27-P\\_1107-Another-Reason-to-Quit-EN-Jan2018-FINAL.indd \(canada.ca\)](https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/government-canada-radon-guideline.html)

Government of Canada. (2009). *Government of Canada Radon Guideline*. <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/radiation/radon/government-canada-radon-guideline.html>

World Health Organization (2009). *WHO handbook on indoor radon: a public health perspective*. [http://whqlibdoc.who.int/publications/2009/9789241547673\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241547673_eng.pdf)