

**The research project is organized by the EVICT RADON NATIONAL STUDY team of pan-Canadian cancer researchers, who are located at the BC Cancer Agency, the University of British Columbia, the University of Calgary, Queens University, the University of Waterloo, Dalhousie University, as well as the BC Generations Project, the Alberta Tomorrow Project, and the Atlantic PATH Project, which are all part of the CanPath coalition of longitudinal health studies.**

For administrative purposes, the research ethics approval of this study was provided by the Health Research Ethics Board of Alberta – Cancer Committee.

**STUDY TITLE:**

**Understanding Canadian Environmental Lung Toxicant Exposures, Biomarkers and Health Impacts through Transdisciplinary, Citizen Science Research**

FUNDED BY PEER-REVIEWED RESEARCH and OUTREACH GRANTS FROM:

Health Canada  
The Canadian Cancer Society  
The Canadian Institutes of Health Research  
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The Canada Foundation for Innovation

Study ID: HREBA.CC-24-0310

Contact Information: [radon@ucalgary.ca](mailto:radon@ucalgary.ca)

**The project lead is Aaron Goodarzi**, and he is joined by the following Senior Investigators from across Canada whose expertise is in (these disciplines): Maria Aristizabal (biology), Darren Brenner (epidemiology), Graham Dellaire (biology), Trevor Dummer (epidemiology), Doreen Ezeife (medicine), Amy Li (engineering), Geoff Maksym (engineering), Victor Martinez (biology), Cheryl Peters (epidemiology), Cathy Ryan (geoscience), Joshua Taron (building science), Alain Tremblay (medicine), Robin Urquhart (epidemiology), Alison Wallace (medicine), Michael Wieser (radiation physics), and Jennifer Vena (epidemiology).

**THANK YOU FOR YOUR INTEREST** in becoming a RESEARCH PARTICIPANT within the Evict Radon National Study. *Before consenting to become a research participant in our work, we ask that you please read the information below, so that you can become aware of the study terms and conditions.* Everything you need to know is explained in detail in [this downloadable pdf](#) that you should keep for your records. We thank you in advance for your time.

## **TERMS AND CONDITIONS of our PARTICIPATORY RESEARCH**

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The **PURPOSE** of this study is to measure radon exposure in Canada in multiple different ways, determine how this source of lung cancer is shaped by buildings, geologies, behaviours, and to develop technology needed to assess radon exposure in different groups of people using biological specimens such as toenail clippings. For plain language explanations of radon and its health effects, please visit <https://evictradon.org/radon/>.

The pan-Canadian confederation of researchers who are involved in this work come from many different disciplines, and are working together to use outcomes of this project to develop solutions to Canada's existing and worsening radon exposure problem as it relates to lung cancer risk. You can read more about Canada's radon exposure issue at the most recent Cross-Canada Survey of Radon found at: <https://crosscanadaradon.ca/survey/>.

The research project is organized by the Evict Radon National Study team of pan-Canadian cancer researchers at universities, longitudinal health studies and public health agencies across Canada, and is administratively based at the University of Calgary. The project lead is Aaron Goodarzi, and he is joined by the Senior Investigators from across Canada. More information about our researchers may be found at [www.evictradon.org/scientists/](http://www.evictradon.org/scientists/).

The Evict Radon National Study involves **PARTICIPATORY** research, in which eligible people agree to deploy radon test devices to test the indoor air of residential buildings in which they live (and have lived for at least five years), and share the outcomes of these radon tests with the research team. Participants are additionally asked to collect biological specimens such as clippings of their toenails, and/or provide additional information such as factors influencing their lung health and/or disability status.

**WHY TOENAILS?** Our project focusses on determining lifetime exposure to radon by measuring the radon decay products that accumulate in humans after exposure to radon gas and radon-decay products. In simple terms, radon decay products are removed slowly by our bodies in several different ways, including via our hair and nails. Toenails are ideal for this study since they are something that nearly everyone has, are not exposed to as many chemicals (household detergents, etc.) compared to hair or fingernails, and are relatively easy for most people to collect, store, and send.

At this time, **THIS STUDY IS OPEN TO ALL ELIGIBLE ADULTS LIVING IN CANADA** who have the authority (and/or permission from adult occupants within the residential property in question) to perform a radon test; this includes people who may be:

- Interested in radon testing and participating in scientific studies.
- Invited to participate through an opportunity suggested by a lung cancer screening program, oncologist, physician or patient advocate referral.

- A previous participant in the Evict Radon National Study, who consented to be contacted for future radon related research opportunities.
- A part of a Canadian Partnership for Tomorrow longitudinal study cohort.

***In all cases, TO BE CONSIDERED ELIGIBLE, prospective research participants must have lived in the residence to be radon-tested for five years or more, at the time their radon test is to start. To be considered eligible, prospective participants must also verify that (to the best of their knowledge) they will continue to live in this same residential building for the 120 day period of study participation, after which there are no further obligations.***

At this time, up to 11,500 eligible and willing persons may be **INVITED to become RESEARCH PARTICIPANTS** to perform a radon test.

Up to 10,000 eligible research participants may be requested to provide all toenail clipping samples they collect over a 120 day period, to be used for the purpose of measuring the presence of radon decay products. In that project, our goal is to determine if long-term, personal exposure to radon can be evaluated by measuring the radon decay products that are present in certain 'disposable' human tissues. Toenail clippings are ideal for this purpose as, compared to things such as hair or fingernails, they are not routinely exposed to quite as many chemicals (cleaning products, foods, dyes, etc.) that might complicate the analysis, they grow more slowly compared to these other tissues (meaning they are a better read out of longer-term exposures), and are they generally easy and comfortable for most people to collect.

An additional 1,500 eligible research participants who are experiencing disability are also being recruited for a project exploring the relationship between how disability influences time spent at home versus other environments, and the influence this has on lung cancer risk from environmental exposures such as radon. These persons are also eligible to participate in the toenail collection study outlined above, if they wish, and would be sent a toenail collection kit alongside their disability-study specific radon test.

## **WHAT YOU ARE BEING ASKED TO DO TO DETERMINE ELIGIBILITY**

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For people who are interested in becoming research participants for the projects described in the previous section, **WHAT YOU HAVE TO DO** is first complete one of two online eligibility surveys, with survey choice depending on whether or not you are experiencing a disability that has lasted for six months or more.

- Upon submission of eligibility survey responses, our team will then verify eligibility and, if you are then selected, you will be contacted to confirm your consent.
- Please be aware that we aim to recruit people "evenly" across Canada – meaning that the final group of participants reflects Canada (where we are living, etc.) in the best possible way we can achieve. Beyond this, we operate on a first-come, first-served basis, to be as fair as possible to those interested in this work.
- We aim to send out invitations on the 1st and 15th day of each month (or nearest business day) until all available participant slots are taken.

**If INVITED**, you will be provided with detailed consent information so that you can make an informed decision to agree to participate. Selected, eligible persons who then provide informed consent will be considered research participants and shall be mailed a study kit that contains a no-cost, C-NRPP certified radon testing device and/or toenail collection kit.

If you are not selected to participate, or do not wish to carry out the research participant activities outlined within this document (such as collecting your toenails or completing disability surveys), but you are still interested in testing for radon, then you may wish to consider becoming an Evict Radon National Study citizen scientist, which you can learn more about by [going to our study website](#).

## **WHAT YOU ARE BEING ASKED TO DO AS A SELECTED RESEARCH PARTICIPANT**

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Everyone who consents to being a research participant will receive a no-cost 120 day radon test kit via Canada Post, and are asked to deploy this within their primary house (meaning the building in which you typically sleep for a majority of the year). These radon devices are administered and quality-controlled by our C-NRPP (Canadian National Radon Proficiency Program) certified radon testing partner.

1. You will need to provide us your home address, and we will send you (at no cost) a study participation kit directly via Canada Post.
2. On receipt of your study participation kit, you are asked to deploy the radon test device in your residence for a period of 120 days, and return the test kit in the provided, pre-labelled Tyvek envelope (provided with your kit).
3. All research Participants are asked to complete two short online surveys, one that will happen when you register the radon kit online at the start of radon testing period, and one at the very end of the 120 day radon test, just before you return the device via the post.
  - a. ***It is important that you try your best to carry out your radon test for 120 days only. The testing period needs to be a minimum of 120 days and a maximum of 127 days.***
  - b. To help you meet this research participant obligation, we will provide you with automated reminders by email, as you near your “end test” date.
4. Research Participants who consent to participate in the disability research are ALSO asked to complete a third online questionnaire to answer additional disability and lung health related questions. The disability project-specific survey will be provided to you part way through your radon test period and is estimated to take 20-30 minutes to complete.
  - a. As long as the responses to these questions are about you, a caregiver is welcome to assist you in completing this (or any other) online survey as part of this research.
5. Research Participants who consent to provide toenail clipping samples are ALSO asked to collect all clippings from their toenails over the entire 120 day period of the radon test.
  - a. We ask that you shower / clean your feet prior to clipping your toenails during the period you are collecting samples for this research.
  - b. We ask that you remove any toenail polish before collecting your toenails at least 14 days before clipping them.

- c. All toenail clippings should be obtained using your own preferred grooming tools and then placed in bags that we provide. There are four bags in total, each intended to contain all toenail clippings you obtain every 30 days.
  - d. Part way through the radon-testing / toenail clipping collection period, you will be asked to complete a third online survey related specifically to the toenail analysis study.
6. Research Participants who consent to participate in the disability research may opt to also collect toenails. While not mandatory, this option is available in the interests of fairness, and these research participants would be asked to complete all activities outlined in points #4 and #5 above.
  7. At the end of the 120 day testing period, you are asked to return kits by pre-paid mail.
  8. Within several weeks of the testing laboratory receiving the radon test device, research participants can expect to receive their household radon test outcome by direct email, using the email address they provide. Research participants may also request these results from our team, by emailing [info@evictradon.org](mailto:info@evictradon.org).
  9. Research participants also agree to be contacted by email regarding the ongoing outcomes of this study and closely related research opportunities. For example, research participants can expect free-to-download copies of all annual research outcomes via one annual email sent out near the end of each calendar year.

We wish you to know that, if you are not interested becoming a research participant, radon test kits are widely available for sale via private retailers. We do not endorse any commercial entity and therefore cannot recommend alternative devices directly.

## **WHAT IS IN THE RESEARCH PARTICIPANT RADON TEST KITS?**

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Your Evict Radon National **STUDY TEST KIT** includes a long-term alpha track test device (called a RadTrak<sup>3</sup>), pre-paid return shipping from anywhere in Canada to our Canada-based test collection hub, the return envelope, kit deployment instructions, and the pre-paid radon test device analysis processing fee at the laboratory.

### ***Other things you should know about the test kits include:***

- To deliver kits across Canada, we have elected to use Canada Post letter mail, which provides the most cost effective and reliable method of delivering parcels across all areas of Canada, no matter how remote.
- You should place your radon test in your residence for 120 days only, between the start of September and very early June; this means the last date to deploy the kit in a given year is approximately **February 1<sup>st</sup>**.
- If you have consented to collect toenail clipping samples, you will ALSO receive four pre-labelled small plastic bags, together with toenail collection instructions.
- Within a 6-8 weeks of shipping your kit to the return address, your residences' radon test results will be sent to you directly using the email address that you used to register the kit.

## **IMPORTANT INFORMATION ABOUT THE RADON TESTING PROCESS:**

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Prior to selecting a test device for this study, our researchers evaluated a number of products currently on the market and determined that RadTrak<sup>3</sup> long term radon test device manufactured by Radonova was the best fit to offer the most scientifically reliable results to all parties. Radonova Inc. labs are a radon test provider with ISO 17025, 14000 and 9001 Certifications – meaning they are one of two radon test manufacturers and testing laboratories certified to meet these international standards that specify rigorous requirements for a quality management system. For research that is to have global reach and recognition, using devices with these certifications is essential.

Radon testing in Canada must also be managed by C-NRPP (Canadian National Radon Proficiency Program) certified professionals, regardless of device. Our researchers work with C-NRPP professionals at Radon West Ltd to ensure radon test device quality controls and distribution meets current national standards.

The above information does not constitute an endorsement by any of the researchers involved in this project (or their home universities) for either Radon West Ltd or Radonova or any of their products or services. Outside the context of this research study, we are not in a position to certify the quality or reliability of any equipment sold by Radon West Ltd or Radonova.

**The DIRECT BENEFIT of being a research participant in this work** is receiving a quality controlled long term radon test kit and your residence's long-term radon reading via our C-NRPP quality-controlled radon testing process (e.g. use of duplicates, blanks, and controlled positives) that ensures the most reliable readings possible. Having radon results enhanced by these quality controls is not typically available through retail radon testing, but is integral to research.

**The POTENTIAL or INDIRECT BENEFITS of participation include:**

1. Increasing your personal knowledge of the origins and modifiers of the Canadian radon exposure problem.
2. Carrying out work that allows Canadian cancer research teams to better develop and recommend solutions to reduce and/or prevent radon exposures now and in the future, something predicted to reduce the future burden of lung cancer in Canada.
3. Carrying out work that allows Canadian cancer research teams to develop a method to determine lifetime radon exposure that may be helpful to ensure more people who need early screening for lung cancer are able to access these programs.

There are **NO KNOWN DIRECT RISKS** of physical harm connected with participation in performing a radon test as part of this study, beyond what is normal for grooming your toenails.

The **POTENTIAL or INDIRECT RISKS** associated participation in this work may include learning that the building you are testing contains radon levels that you or others may identify as being a health concern – this is true of obtaining radon information from any test device. If you are experiencing disability, you will be asked to report how this may or may not impact how you split your time between different buildings.

Please be aware that, in Canada, it is entirely your choice to act upon your radon test results to protect your health, and there are effective solutions to permanently reduce high radon exposure. If you decide to pursue mitigation there may be financial costs associated with installation of these systems. For radon levels at or over 200 Bq/m<sup>3</sup>, you are advised to reduce levels below this amount before selling your house to another person or, if no action is taken at all, at least disclose this outcome during a real estate transaction. For more information, we refer you to the most up to date facts via [Health Canada](#) and/or the [C-NRPP](#).

## PRIVACY AND CONFIDENTIALITY

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If you chose to become a research participant in the Evict Radon National Study, then **PLEASE BE ASSURED** that all information entered in the following survey will be kept 100% confidential and stored in secured servers, subject to Canadian and EU general data protection regulation privacy laws.

- Identifiable data will never be shared with any third party and, once linked to your residence's radon reading, will be de-identified so that you can never be personally traced within the data.
- Your specific address will never be published in any format, and specific residences and individual neighbourhoods are never linked to given radon readings.
- We take exceptional measures to ensure your privacy is maintained throughout this process. If you have any questions or concerns regarding this consent information or, if at any point you wish to withdraw from our study, please us at contact [radon@ucalgary.ca](mailto:radon@ucalgary.ca).

## WHAT ARE MY RIGHTS AS A PARTICIPANT IN THIS STUDY?

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Your rights to privacy are legally protected by federal and provincial laws that require safeguards to ensure that your privacy is respected. By providing your consent to join this study, you do NOT give up any of your legal rights.

## WHAT IF MY RESIDENCE IS FOUND TO HAVE HIGH RADON THROUGH THIS STUDY?

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You will learn the level of radon of the residential building that you have radon tested for 91 days or more (measured in Bq/m<sup>3</sup>, the unit that radon is evaluated in Canada). If your residence is found to have levels of radon above Health Canada's administrative action guideline of 200 Bq/m<sup>3</sup>, it is still your personal choice whether to take action (such as the installation of a professional radon reduction) or not.

The Evict Radon National Study does not provide radon mitigation estimations or services, and the research team (and their families) are NOT directly affiliated with anyone who offers these services. If you deem your household radon levels to be of concern to your health, we do provide up to date information on our [website for those who are seeking information on mitigation](#).

For independent information on radon mitigation, please see the [Canadian Nation Radon Proficiency Program](#) and/or [Health Canada](#), and both of these groups may be contacted by phone or email. Radon testing is not unique to the Evict Radon National Study and you are also able to learn this through many other radon testing options that are available to the public.

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#### **WHAT IF SOMETHING IS DISCOVERED ABOUT ME DURING THIS STUDY?**

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If you are participating in the toenail study, you will receive a plain language report on the aggregated outcomes this part of the project once we have completed the analysis.

The report will show the outcomes for the whole group in a de-identified manner, contextualized to household radon exposures across the population. As this is a research study whose experimental outcomes are not yet certain, we do not yet know if the measurement of radon decay products in toenails are going to be helpful for personalized risk evaluation, and so at this time we cannot guarantee that we will be able to share your individual toenail analysis outcome with you.

We can say that, if this information is determined to be helpful to you in a manner that does no harm, we will make every effort to share this with you by direct communication, following the appropriate approvals from the research ethics oversight board who evaluate what we do.

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#### **ARE THERE ANY CONFLICT OF INTERESTS RELATED TO THIS STUDY?**

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No. There are no conflicts of interest relating to this study. The researchers and their families have no known personal connection to any for-profit group relating to this work. Funding for this study comes from public sector agencies including those listed on the first page of this informed consent document. Additionally:

- The researchers involved in this study ([www.evictradon.org/scientists/](http://www.evictradon.org/scientists/)) and their home institutions do NOT benefit in any way from the sale of test kits and have no financial stake in or relationship with either Radon West Ltd or Radonova, nor any other private radon testing or mitigation retail or industrial entity.
- Identifiable information from surveys or radon tests are not shared with any 3<sup>rd</sup> party. Research Participants agree to provide researchers with the radon data for the property they have chosen to test for radon, which will be linked to the associated property metrics, demographics and activity patterns provided through online questionnaires.
- For the purposes of study support, follow-up, reporting outcomes, and further information about radon-related research, research participants agree that our team may contact them using the email address provided during informed consent. Research Participants may opt out of this contact list at any time.
- Once again, please be assured that your information will remain completely confidential and, in turn, is helping Canadian researchers understand and develop solutions to our radon problem.



**If you have any questions about your rights as a participant**, or about ethical issues related to this study, and you would like to talk to someone who is not involved in the conduct of the study, please contact the Office of the *Health Research Ethics Board of Alberta - Cancer Committee* at:

- Telephone: 1 780 423 5727
- Toll Free: 1 877 423 5727

## DECLARATION OF INFORMED CONSENT

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Thank you for reading the informed consent information above and for your interest in becoming a research participant in the Evict Radon National Study. ***If you decide to participate in this study, you will need to respond “YES” to the specific informed consent statements below.*** If you want additional information before answering these question, please contact the study lead directly at [radon@ucalgary.ca](mailto:radon@ucalgary.ca).

**Consent Statement 1: I understand that I have been asked to take part in a research study and why it is being done.**

- ☐ (Yes I understand)

**Consent Statement 2: I understand what I am to do (If I decided to take part) and how the information collected will only be used for this study.**

- ☐ (Yes I understand)

**Consent Statement 3: I understand the potential benefits and risks associated with this study and that I am free to leave this study at any time, without reason or penalty.**

- ☐ (Yes I understand)

**Consent Statement 4: I understand that I do NOT give up any of my legal rights by participating in this study.**

- ☐ (Yes I understand)

First Name

Last Name

Enter your contact email address here

Re-enter your contact email address here

**CLICK TO CONSENT AND JOIN THIS STUDY**

**By entering your full name, email address and clicking the consent button above, you will be directed to the secure webstore where you can purchase your at-cost kit.** A list of answers to Frequently Asked Questions may be found at [www.evictradon.org/FAQ](http://www.evictradon.org/FAQ) and you can always email us at [info@evictradon.org](mailto:info@evictradon.org). If at any point you wish to withdraw from our study, or have any concerns about the nature of this research study, please us at contact [radon@ucalgary.ca](mailto:radon@ucalgary.ca). The review and approval of this national study was performed by the Health Research Ethics Board – Cancer Committee, which is based in Alberta, Canada. Study Ethics ID = HREBA.CC-24-0310