SOCIAL INNOVATION NARRATIVES

Journal of
COMMUNITY SAFETY & WELL-BEING

A Canadian First Nations radon assessment and COVID-19 restrictions: A difficult pairing

Jared Bishop*

ABSTRACT

Radon is a known carcinogen and a by-product of degrading naturally occurring radioactive elements. The North Shore Micmac District Council (NSMDC) board of directors, in Eastern New Brunswick, Canada, were aware of this issue and saw a need for increased radon testing and awareness in their communities. The initial plan was to administer a testing blitz across communities to gauge the current levels of radon exposure in both residential and band-owned structures. This, with Elder consultation and a participant health survey, would create a data set used to guide future strategies effectively and better direct resources to mitigate the leading cause of lung cancer in non-smokers. These plans were put in place prior to the COVID-19 pandemic that began in March 2020. The subsequent provincial levels of restriction could not have been predicted. The ever-changing pandemic-related restrictions, and public health's focus on a new deadly pathogen, led to difficulties managing and following through on many health and wellness projects. These circumstances led to a unique situation that delayed results, prolonged exposure to a known carcinogen, and may have consequences in the long term. Few procedures, treatments, or medications do not have side effects, and even warranted pandemic-related measures affect other aspects of health.

Key Words Pandemic; carcinogen; Micmac; Mi'kmaq.

INTRODUCTION

The North Shore Micmac District Council (NSMDC), situated in Eastern New Brunswick, is a First Nations Tribal Council led by a Board of Directors comprised of seven First Nations Chiefs. The council provides consultation, directs services, and adds capacity to the seven member communities through housing, emergency management, technical supports, health and water resources, to name a few. These leaders saw a need to assess their people's current level of risk concerning radon.

Radon gas is a naturally occurring, radioactive, colorless, odorless gas that is directly associated with an increased incidence of lung cancer. New Brunswick, Canada, has some of the highest incidences of elevated radon levels in housing and public structures and some of the most severe cases nationally (Chen, 2021). Radon is the principal cause of lung cancer in the non-smoking population in Canada, with smoking in addition to exposure to elevated levels of radon gas increasing the lifetime risk of lung cancer in a linear fashion (Garcia-Rodriguez, 2018).

First Nations people have unique housing situations, histories, and autonomy that warrant individual ground-level research in order to yield usable data that improves the quality of life in communities. Demographics such as low rates of home occupant ownership, building code requirements separate from provincial building codes, and cultural differences all make First Nations people a group set apart, with potential for special challenges and risks (Randle & Thurston, 2022). Canadian First Nations communities have high numbers of smokers and are known to typically have higher rates of home occupancy and multigenerational home than off-reserve homes in Canada (Sarkar, 2017). It is well documented that the North Shore Micmac District Council (NSMDC) communities are situated in an area rich with decaying subterranean radioactive elements. Areas of similar geological makeup have been studied in the past, finding that as many as 20% to 40% of homes and public buildings need urgent remediation in surrounding areas (S. Z. Stanley, 2017). Current radon impact assessments are critical as lifestyle and technology allows for more time in the home and less natural home ventilation (F. I. Stanley, 2019). It is now supposed that it will take even greater efforts to alleviate the additional burden of lung cancer attributed to radon than was previously estimated, and home mitigation is the best avenue to reduce the risk (Priyanka, 2019).

Typically, on Canadian First Nations land, the Band is the owner of all or most homes and buildings and manages

Correspondence to: Jared Bishop, 38 Micmac Road, Eel Ground, NB E1V 4B1, Canada. **E-mail:** jaredbishop@nsmtc.ca

To cite: Bishop, J. (2023). A Canadian First Nations radon assessment and COVID-19 restrictions: A difficult pairing. *Journal of Community Safety and Well-Being, 8*(2), 181–184. https://doi.org/10.35502/jcswb.320

SGPUBLISHING Published by **SG Publishing Inc.** CSKA Official publication of the **Community Safety Knowledge Alliance**.

renovations, inspections, and maintenance. This lack of a sense of ownership has been connected to lack of interest in individual home radon testing historically (Khan, 2021). Thus, the onus is put on leadership to initiate the testing and mitigation of radon. One avenue for collecting this information uniformly would be to partner with a tribal council such as the NSMDC. This would open the door to multiple communities, each with individual governance but accustomed to sharing information, capacity, and resources based on cultural similarities and mutually beneficial agreements. This Tribal Council represents seven Mi'kmaq communities in New Brunswick (Figure 1). These people are the first known inhabitants of Eastern New Brunswick, as well as large areas of Nova Scotia, Prince Edward Island, and parts of Québec (Kovach, 2009).

A Typical Community Radon Testing Study

Testing homes and residential buildings for radon in Canada is done following the guidelines created and regularly updated by Health Canada. These guidelines lay out specific information concerning testing equipment, testing locations, and information for assessing special buildings/interest groups (schools, hospitals, large buildings). These consistent federal guidelines allow for uniform and comparable results nationally. The goal of a typical radon testing drive would be to increase community awareness of radon and mitigators through social media campaigns and in-person consultation with the public, and healthcare staff. After the awareness campaign, kits would be distributed to interested parties either in person, by mail, or using a delivery service.

Single-family homes, attached homes, and apartments are typically tested with a single radon kit placed in a lived-in room far from exterior doors, windows, vents, and well off the floor. Radon levels in homes are ascertained using long-term (>90-day) testing kits. The testing period is most often completed over the coldest season of a country, as this is when doors and windows are open the least, and the test therefore reveals a building's highest annual level of radon. Most test kits have a Teflon disk that allows for easy tracking of the number of alpha particles created by decaying radon gas. A becquerel is a measure of radioactivity. One becquerel (Bq) is equal to one radioactive decay per second. Radon concentrations in the air are usually measured in becquerels per cubic metre (Bq/m^3) (ICRP, 2019). These alpha particles are the primary cause of lung damage and radon-associated

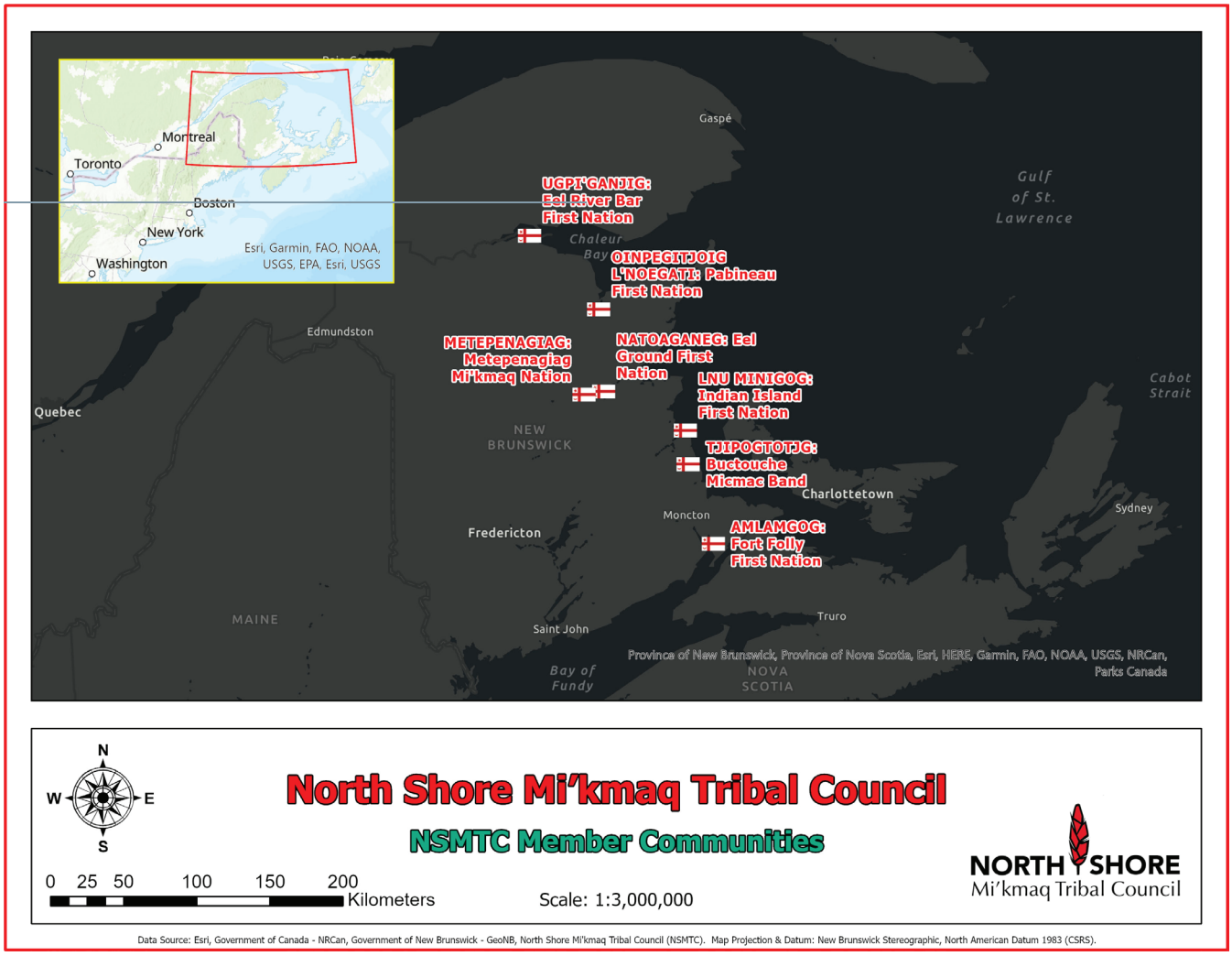

FIGURE 1 ????

cancers. In accordance with Health Canada guidelines, 10% of kits have a duplicate kit to be placed within 30 cm of the first for the same duration of time, and 2% of kits are blank for quality assurance purposes. After the testing period, kits are sent to a lab for assessment, and homes found to have levels greater than the Health Canada Guidelines of 200 Bq/m^3 require mitigation.

The mitigation process varies by home/building design but is typically successful in drastically reducing exposure to radon. For residential homes, mitigation is typically a simple one-day installation of a radon mitigation system, with potential adjustments to air exchanger settings or basement crack sealing supplementing the system. While each home design requires special considerations, the most common system consists of a perforated polyvinyl chloride (PVC) pipe passed through the concrete basement floor, under the foundation. This attaches to a contained fan that creates negative pressure, drawing air from under the home. Air exhausts from the system via the attic, side wall, or drain tile. Homes with crawlspaces are a unique challenge that require placing a layer of polyethylene barrier on the dirt floor of the crawlspace and sealing the periphery of the floor. This barrier then has the same system installed with the intake pulling air from under the polyethylene barrier. Regardless of home design, these systems are installed by a Certified Radon Mitigator. Public buildings have more specific guidelines and more options for testing. These are the typical methods and strategies employed in Canadian radon testing and mitigation.

The threshold set for this project was to test at minimum 10% of total on-reserve households (there are approximately 1,000 residential units across the seven communities) and three to six community buildings in each community across the participating First Nations. The plan was to follow these strategies to the letter, until the COVID-19 pandemic began.

A PANDEMIC CHANGES EVERYTHING

New Brunswick was successful in delaying COVID-19 outbreaks early on in this pandemic through strict interprovincial travel restrictions and local efforts, but by the beginning of the winter of 2021–2022 the province was more or less indistinguishable from other Canadian provinces (Broschek, 2022). First Nations in Canada have a unique governance structure and are separate nations within the country of Canada (Kuokkanen, 2019), allowing for each individual First Nation to assess its own level of risk and impose pandemic-related restrictions accordingly, whereas municipalities were required to adhere to provincial restrictions. As outbreaks became more widespread, there was a marked increase in local restrictions and a reduced number of in-person events, both on and off reserve land.

Health resources and focus were rightly directed to managing outbreaks, while other health-related initiatives had reduced priority levels. This was not a uniquely First Nations experience, it was global. The radon study was one such affected project. Radon and the risks associated with it are fairly well-known by the public within the province, and its status as a carcinogen is identified by a higher percentage of the public than in most other provinces (Government of Canada, 2022), but in the shadow of an unknown threat, the known threat was difficult to prioritize.

How Does a Pandemic Affect a Community Health Study?

Radon testing requires a physical presence. A person must install a kit, and a test kit has to be handled, transported across large areas, placed, and returned. Each step in the radon testing journey has potential for transmission of a contagious disease (Groth, 2022), and restrictions were put in place by provincial governments to limit the spread of disease through these vectors. The variability over time of provincial restrictions, and the community-specific restrictions in response to community outbreaks, hampered the distribution of tests and the effectiveness of awareness campaigns. One such example was a health centre that partnered with the project and promoted the need for testing homes for radon regularly via Facebook. The health director reported that it was difficult to keep radon on top of the page, as they were being asked to deliver federal, provincial, and community information about the ever-changing nature of COVID-19 several times daily. Other community champions noted fear from potential participants related to handling materials and contact with persons delivering testing equipment.

On the ground, entire communities were locked down and only open to community members at various times, depending on their levels of outbreak. Buildings typically open to the public, such as Band offices and community centres, were shuttered, accessible by appointment only, or limited to community members only at various times through the winter of 2021–2022. Even mailing kits to communities was discouraged due to the risk of transmission (Groth, 2022). Kits had to be distributed by health staff already overwhelmed by a pandemic, or administration staff already tasked with additional job requirements, such as cleaning, temperature checking, security, and occupant monitoring, to name a few. It was not ideal, but these overworked individuals were the only vector available to get testing supplies into the community. There is no doubt that test kit distribution was hampered by our collective efforts to reduce the spread of a very contagious virus.

These obstacles needed to be tackled with creativity. One community champion was also the supervisor for Meals on Wheels and was able to reach interested study participants who may not have been able to enter, or were unwilling to risk entering, public buildings where the community distribution centres were located. When possible, health teams distributed kits outdoors to reduce the likelihood of transmission and limit participants' time indoors. Outdoor community mailbox locations were also used to distribute kits, but these sites had to be staffed by persons in total personal protective equipment (PPE) and they had to brave biting cold weather.

As restrictions would not allow for in-person kit installation, participants were tasked with installing their own radon testing kits. Each participant was supplied a brochure and links to educational material explaining the ideal testing locations in homes. These resources, while beneficial, are no replacement for a Certified Radon Tester. Over 50% of test kits distributed for residential testing were either lost, not returned, or placed inappropriately (next to doors, in crawlspaces, cellars/basements that are not lived in) and had to be removed from the study. Participants stated that, often, they were given poor second- or third-hand information that

led to these kits being placed in locations that would yield false lows/highs. The potential for radon-related cancers increased in a linear fashion depending on the concentration and duration of exposure (Garcia-Rodriguez, 2018), and the restrictions related to the pandemic complicated the process of getting testing equipment into the hands of First Nations people.

CONCLUSION

In the subsequent cold season of radon testing, the number of participants doubled with far less effort. This could be due to compounding awareness campaigns into subsequent years, and knowledge being shared more readily by previous participants. There can be no doubt that in-person meetings and knowledge sharing improved testing uptake and would not have been possible in the previous pandemic environment.

In medicine, there are precious few procedures, treatments, or medications that do not have side effects. Many of these may not become evident for years, or the participant may never become aware of them, but that does not mean that a side effect should not be considered when managing an illness. In the same way, we must review and assess the effects of harsh pandemic-related restrictions during future pandemics. The lives saved in the short term are valued but will always come at a cost. In this specific case, pandemic-related restrictions extended the years of exposure to elevated levels of radon and increased the risk of lung cancer for many First Nations people in New Brunswick.

ACKNOWLEDGEMENTS

University of New Brunswick, and Michelle Gray (Acting Dean of Environmental Management and Project Co-Supervisor). Bianca Langille, Emergency Program Manager at the North Shore Micmac District Council (Project Co-Supervisor). The North Shore Micmac District Council leadership and community champions. Pam Warkentin and Erin Curry from Take Action On Radon. Without their efforts this study would have never accomplished as much as it did. Funding: First Nations Environmental Contaminants Program.

CONFLICT OF INTEREST DISCLOSURES

The researcher works for a Tribal Council, that represents and provides services to the seven member communities that participated in the study. The Board of Directors of the Tribal Council is comprised of the Chiefs of each of the seven communities. There was no additional monetary compensation provided to the researcher for taking on this project, and community leaders/participants were afforded no compensation for participation.

AUTHOR AFFILIATIONS

*Employed by: NSMDC (North Shore Micmac District Council), 38 Micmac Rd, Eel Ground, NB E1V 4B1, Canada. Student of: University of New Brunswick (Department of Forestry and Environmental Management), P.O. Box 4400, 28 Dineen Drive, University of New Brunswick, Fredericton, NB E3B 5A3, Canada.

REFERENCES

(2022). *The Households and the Environment Survey Canada.* Ottawa: Statistics Canada, Knowledge of radon and testing Table: 38-10-0086-01.

Broschek, J. (2022). Federalism, political leadership and the Covid-19 pandemic: explaining Canada's tale of two federations. *Territory, Politics, Governance*, Vol 10, 2022 751-758.

Chen, J. (2021). A Summary of Residential Radon Surveys and the Influence of Housing Characteristics on Indoor Radon Levels in Canada. *Health Physics*, Dec 1;121(6):574-580.

Garcia-Rodriguez, J. (2018). Radon gas—the hidden killer. *Canadian Family Physician* , 496–501. 64(7) July.

Groth, L. (2022). *Can COVID-19 Spread Through Mail?* Philadelphia: Health.

ICRP. (2019, March 5). Retrieved from The System of Radiological Protection developed by The International Commission on Radiological Protection (ICRP): http://icrpaedia.org/Radon:_Units_of_Measure#:~:text=A%20becquerel%20is%20a%20measure,of%20air%20(cubic%20metre).

Khan, S. D. (2021). Rising Canadian and falling Swedish radon gas exposure as a consequence of 20th to 21st century residential build practices. *Scientific Reports*, volume 11, Article number: 17551.

Kovach, M. (2009). Indigenous methodologies: Characteristics, conversations, and contexts. In M. Kovach. University of Toronto Press: Toronto.

Kuokkanen, R. (2019). *Restructuring Relations: Indigenous Self-Determination, Governance, and Gender.* New York: Oxford Press.

Priyanka, T. A. (2019). Estimates of the current and future burden of lung cancer attributable to residential radon exposure in Canada. *Preventative Medicine*, Volume 122, May 2019, Pages 100-108.

Randle, J., & Thurston, Z. (2022). *Housing Experiences in Canada: Status First Nations people in 2016.* Ottawa: Statistics Canada.

Sarkar, D. H. (2017). Indoor Radon in Microgeological Setting of an Indigenous Community in Canada: A Pilot Study for Hazard Identification. *The International Journal of Occupational and Environmental Medicine*, 8(2): 69–79.

Stanley, F. I. (2019). Radon exposure is rising steadily within the modern North American residential environment, and is increasingly uniform across seasons. *Scientific Reports*, #9 18472.

Stanley, S. Z. (2017). Comprehensive survey of household radon gas levels and risk factors in southern Alberta. *Canadian Medical Association Journal Open*, Vol 5 E255-E264.