Radon: Policy Statement July 14, 2017

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This document provides guidance for program planning and implementation related to the mitigation of local radon exposure.

Radon

Radon is responsible for more than 3,000 deaths from lung cancer per year in Canada. It is the second largest cause of lung cancer, after smoking and the number one cause in non-smokers. Radon is found in all parts of the country and can vary in levels from home to home. This colourless, tasteless, odorless gas is naturally occurring in soils and rock. As uranium in the soil decays, radon gas is released and can seep undetected into homes through cracks in the foundation, open sump holes, floor drains, open soils and windows.

The only way to determine the concentration of radon in your home is to test.

With long-term exposure to radon is an increased risk of developing lung cancer (refer to Health Risk section below for details). The level of risk is dependent on the concentration of radon and the duration of exposure. Health Canada has set a threshold of 200 Bq/m^3 (Becquerels per cubic metre) and advises that if the concentration of radon measures above this guideline, steps should be taken to mitigate.

In a 2012 survey of over 3,900 homes, Health Canada found that close to 7% of Canadians are living in households which measured radon levels higher than the recommended 200 Bq/m^3 (Health Canada 2012). The levels of radon varies significantly between the provinces where 45% of health regions have 10% or more of the homes exceeding the guideline. In Ontario, almost 5% of the homes tested exceed the guideline.

Of the 99 homes tested in Grey Bruce, 11.1% had radon levels above 200 Bq/m^3. Since the levels of radon in one home is NOT indicative of the levels in a neighbouring home, Health Canada recommends that all homes be tested for radon.

Health Canada commissioned the development of a Radon Potential Map to assist health regions and municipalities develop and focus their radon risk strategies. There are no areas of the province that are free from radon and levels vary across the region.

According to the map, a majority of homes in Grey Bruce could be located in an area considered a high relative radon hazard.

Health Risk

Lung and bronchus cancer is the second most diagnosed cancer in Grey Bruce and accounts for 13% (131 people) of all new cancer diagnoses and 25% (111 people) of all cancer deaths (GBHU 2014). Between 2000 and 2009 there were 1,310 new cases of lung cancer and 1,113 lung cancer deaths reported in the Grey Bruce region (Table 1).

Table 1. Age-standardized Lung Cancer Incidence and Deaths in Grey Bruce 2000-2009

	# New Cases	# Deaths
All Persons	1310	1113 (111 / year)
Males	737	649 (65 / year
Females	573	464 (46 / year)

After smoking, indoor exposure to radon gas is the second leading cause of lung cancer and the number one cause of lung cancer in non-smokers. In Canada, 16% of all lung cancer deaths are attributed to radon. In Ontario, 14% of all lung cancers deaths are attributed to radon (Table 2). This is equivalent to over 2 people in Ontario dying each day from lung cancer caused by radon (PHO 2012).

Public Health Ontario published a report with the burden of illness by health unit. In 2007, an estimated 20% of lung cancer deaths in Grey Bruce were due to radon exposure (PHO, 2012).

Table 2. Lung Cancer Deaths Attributed to Radon

	% Deaths
Canada	16%
Ontario	14%
Grey Bruce	20%

If radon levels in your home measure above 200 Bq/m^3, non-smokers have a 1 in 20 lifetime chance of developing lung cancer. For a smoker, this risk increases to a 1 in 3 chance (PHO, 2010). This is of particular concern as the smoking rates in Grey Bruce are above the provincial average with close to 48% of the population reported as ever smokers (Table 3).

Table 3. Percent of Population who were Ever Smokers

	% Deaths
Ontario	39.2 %
Grey Bruce	47.8 %

Since 2012, Health Canada has initiated the National Radon Action campaign to increase the level of awareness about radon. Grey Bruce Health Unit joined this campaign by offering information through the media. In 2014, a public survey of residents in Grey Bruce indicated that although 60% of the participants had “heard about” radon, less than half were aware that exposure can increase the risk of lung cancer and less than 8% of the households had been tested (GBHU 2014).

There is a significant lack of public knowledge in Grey Bruce about radon and specifically, a lack of understanding about the risks of developing lung cancer.

Testing

There are two options for testing radon levels in your home. A certified radon measurement professional can be hired to conduct a test and interpret the results. Or, a simple test detection kit can be purchased from a local home building store or online at a cost of $30 to $60. To provide an accurate reading, the test kit is placed in the lowest level of the home where residents spend more than 4 hours a day. The kit is left untouched for a minimum of 3 months and testing is completed during the winter months when windows are kept closed. The kit is sent to a certified lab and results are mailed back to the homeowner. It is important to note that short term radon detection kits are available on the market which can provide results within a few days. However, to ensure accurate results, the Grey Bruce Health Unit and Health Canada recommend a minimum 3 month test period.

Legislation

Currently no legislation governs testing the level of radon in homes or public buildings. Health Canada has published a Guide for Radon Measurements in Residential Dwellings (Health Canada 2017) and another Guide for Radon Measurements in Public Buildings (Health Canada 2016). The scope of the documents is limited to guidance regarding the measurement of radon and offers preventative options available for new homes.

Although some schools in the province have conducted testing, Quebec is the only province in the country to require mandatory radon testing in schools. Bill 11, Radon Awareness and Prevention Act went through a second reading at the Ontario Legislature in July 2014. The new Act encourages homeowners to measure the radon level in their homes and ensures testing in every provincially owned dwelling, school and enclosed workplace. As of July 23, 2016 no meetings of the Standing Committee have been scheduled to address this Bill.

The 2010 National Building Code requires radon protection in all new home construction including designs to minimize the level of radon entering a home through the foundation and a rough-in for a future radon reduction system (Health Canada 2016). Ontario, Quebec, PEI and Newfoundland are the only provinces who have NOT adopted the national requirements for radon into the provincial building code.

In the Ontario building code, radon mitigation measures are only required in three regions: the Town of Elliot Lake, the Township of Faraday, and the Township of Hyman. The Ministry of Municipal Affairs is considering incorporating broader requirements for radon mitigation into the building code in construction of all new houses across Ontario, the update may not occur until 2019.

Some local municipalities have been proactive and put forward resolutions to adopt radon mitigation programs for new construction. The City of Guelph, Central Elgin, St. Thomas and Thunder Bay now require builders to incorporate radon prevention measures into all new home construction. In May 2017, Council in the Township of Southgate and the Municipality of Grey Highlands approved a by-law for the implementation of a Radon Gas Mitigation Program in accordance with Section 9.13.4.1(1) of the Ontario Building Code Regulations and Bill 11, Radon Awareness and Prevention Act, 2012.

Remediation

Health Canada set the guideline of 200 Bq/m^3 in 2007 and makes 2 recommendations for remedial action.

1. Results between 200 and 600 Bq/m^3, recommend taking steps to reduce the radon level within 2 years.
2. Results greater than 600 Bq/m^3, recommend taking steps to reduce the level within 1 year.

If all homes above the current 200 Bq/m^3 Canadian guideline were remediated, an estimated 91 lung cancers deaths could have been prevented in 2007.

Remediation measures vary depending on the concentration levels and should be determined by a radon mitigation technician certified through the Canadian National Radon Proficiency Program (CNRPP). The CNRPP is Canada's national certification program for radon services and sets standards for accreditation. A list of certified professionals in your area can be found on the CNRRP website at http://c-nrpp.ca/.

In general, simple measures including sealing a sump pump opening and filling cracks in the foundation often resolve radon levels to within acceptable limits. In some cases, a soil depressurization system will have to be installed to ventilate and exhaust the radon gas out of the home. This system ranges in cost from $1,500 to $3,000. Once installed, the levels of radon typically fall to negligible levels. It is important that a re-test is completed to ensure acceptable concentrations have been met.

In Ontario, home warranty protection for newly build homes covers costs up to $15,000 for mitigation measures to reduce radon in homes for up to seven years. The Canadian Environmental Law Association (CELA) coordinated a project in 2016 to petition the Federal Ministry of Finance and Health to include radon mitigation costs as an income tax credit and provide subsidies for low-income families.

Radon Awareness Initiatives

November has been established as Radon Action Month in Canada. A recent survey of health units across the province revealed that in most cases radon is simply identified as an environmental health risk on the public websites with some information or a link to an external website. Few health units specifically recommend that homes should be tested. However, Windsor Essex, Thunder Bay, and Wellington Dufferin Health Units have initiated a comprehensive radon awareness campaign involving the distribution of free or reduced cost testing kits and hosting public information sessions about risks and mitigation.

For example, during the month of November in 2015 and 2016, Windsor Essex Health Unit offered free test kits to 1000 homeowners as a part of their "Know your Level" campaign. The goal was to raise awareness and map a more accurate representation of the regional radon levels. The results will be analyzed by an epidemiologist with a report expected in the fall of 2017.

Every year over 1000 people in Ontario are diagnosed with lung cancer attributed to long-term exposure to radon.

In the Wellington Dufferin region, Public Health partnered with the City of Guelph and Health Canada to host public information sessions and offer radon testing kits at a reduced rate. The City of Guelph has initiated a Radon Gas Mitigation Program as per the requirements of the National Building Code. In addition, over the 2017 winter, a certified radon professional will be measuring the levels in all Wellington Dufferin Guelph Public Health office buildings. Currently, work is being done on a radon perceptions study to understand the lack of awareness by the public.

Thunder Bay Health Unit published a report in 2015 which showed that 16% of homes in this region had radon levels in excess of Health Canada's guideline. A prevalence study was conducted where over 500 free radon detection kits were distributed to homeowners who volunteered to test their home. The results showed a remarkable variation in local radon concentrations and that homes within close proximity to one another could have very different radon concentrations (TBDHU 2015).

Conclusions / Recommendations

The information above indicates that local exposure to radon is a significant public health concern for the following reasons:

- Long-term exposure to radon is the second leading cause of lung cancer.
- Twenty percent of lung cancer deaths in Grey Bruce are attributed to radon exposure with a 1 in 3 risk of developing lung cancer in smokers.
- The rate of ever smokers among Grey Bruce residents exceed the provincial average by 9%
- Grey Bruce is located in a region identified as an area of potential high risk for exposure to naturally occurring radon

Grey Bruce Public Health Unit will pursue program and planning initiatives that include:

Increasing public awareness about the health risk associated with long-term exposure to radon with an emphasis on the importance of home testing.

Rationale:

- ✓ Home testing is the only way to determine if radon levels present an exposure risk
- ✓ High concentrations of radon detected in homes can be remediated to reduce or eliminate the risk
- ✓ Public awareness in Grey Bruce about the health effects associated with radon exposure is low
- ✓ Current smoking cessation programs can provide an opportunity for education

Considering the feasibility of conducting a study to enhance knowledge of the prevalence and distribution of naturally occurring radon in Grey Bruce.

Rationale:

- ✓ Provide a better understanding of the health hazard in our communities to better protect and promote health
- ✓ Information could assist in targeting mitigation strategies
- ✓ Partnership with other health units in the region where studies are currently underway could serve as a model for the development of a local methodology

Implementing strategies to make lower cost testing kits available to Grey Bruce residents.

Rationale:

- ✓ Radon levels vary from home to home
- ✓ Low cost kits may encourage residents to carry out the test

Providing support in principle for provincial initiatives aimed at incorporating radon mitigation measures into the Ontario Building Code.

Rationale:

- ✓ Adoption of provincial legislation will ensure mandatory and consistent implementation across municipalities
- ✓ Public Health education campaigns will be strengthened by consistent messaging across the levels of government

Continuing to actively pursue tobacco use cessation strategies.

Rationale:

- ✓ The risk of lung cancer associated with radon exposure is significantly less among non-smokers
- ✓ The rate of ever smokers among Grey Bruce residents exceed the provincial average by 9%

Successful implementation of this program would fulfill the goal outlined in the Ontario Public Health Standard to prevent or reduce the burden of illness from health hazards in the physical environment.

Radon is a preventable cause of lung cancer. Public Health should take a lead in raising awareness.

References

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