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# **RADON: IS IT IN YOUR HOME?**

## **Information for Health Professionals**

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Canada

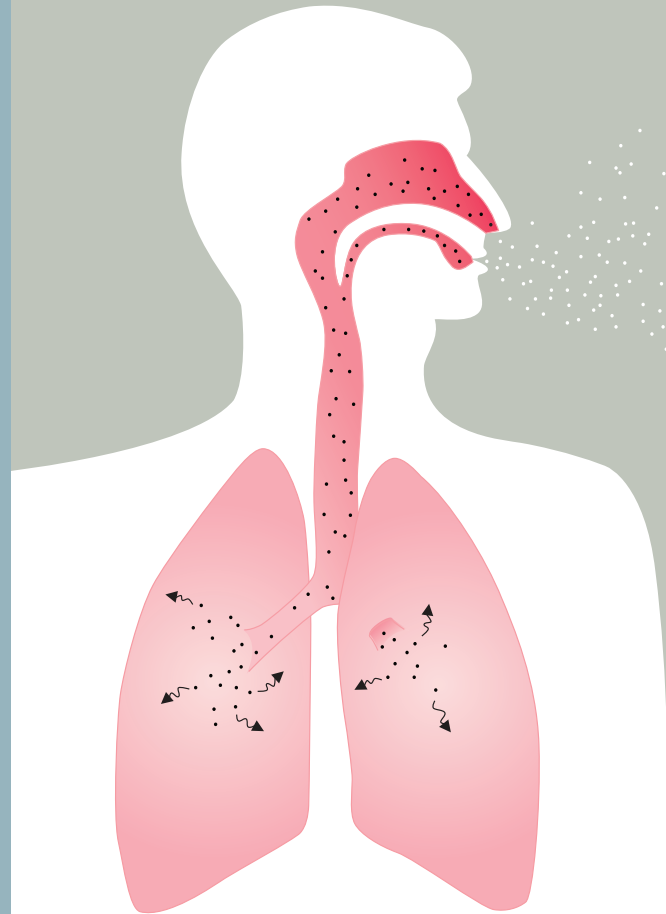
Health Canada recently announced a lowering of the Canadian guideline for indoor exposure to radon. This reduction was the result of new information that indicates the health risk of radon-induced lung cancer occurs at lower levels of exposure than previously thought. Health Canada is embarking on a public awareness campaign to educate homeowners about the health risks of radon exposure, and to encourage them to conduct an inexpensive home test to see if their home levels are higher than the new guideline.

As a health professional, your patients may ask you about the health risks of radon, and the need to test their homes. This fact sheet provides you with some information you can use to answer their questions.

## WHAT IS RADON?

Radon is a colourless, odourless, radioactive gas that occurs naturally in the environment. It comes from the natural breakdown of uranium in soils and rocks. When radon is released from the ground into the outdoor air, it is diluted and is not a concern. However, in enclosed spaces like homes, it can sometimes accumulate to high levels, which can create a health risk. The air pressure inside a dwelling is usually lower than in the soil surrounding the foundation. This difference in pressure draws air and other gases, including radon, from the soil. Radon can enter homes through cracks in foundations, construction joints, gaps around pipes, sump pumps and drains, etc.

The current Canadian guideline for radon in indoor air for dwellings is 200 becquerels per cubic metre (200 Bq/m<sup>3</sup>). This was recently reduced from 800 Bq/m<sup>3</sup>. One becquerel is described as one radioactive disintegration per second.



## WHAT ARE THE HEALTH EFFECTS OF RADON?

The only known health effect from exposure to radon is the increased risk of developing lung cancer. Radon is the second leading cause of lung cancer, after smoking.

Extensive epidemiological evidence from studies of underground uranium miners, complemented by recent residential radon studies in Europe and North America, have shown that there is a measurable risk of developing lung cancer from radon exposure at levels commonly found in residential homes. This risk exists for both smokers and non-smokers, although malignancy from radon exposure is especially likely to occur in cigarette smokers. The carcinogenicity of radon is supported by a consensus of opinion among national and international health organizations. By informing patients about the health risk posed by radon exposure and encouraging homeowners to test their homes to determine radon levels, health professionals can have a positive impact on the national effort to prevent radon-induced lung cancer.

## HOW CAN RADON INDUCE CANCER?

If inhaled, radon decay products can become deeply lodged in the lungs, where they emit ionizing radiation which can penetrate the cells of mucous membranes, bronchi, and other pulmonary tissues. The ionizing radiation energy affecting the bronchial epithelial cells is believed to initiate the process of carcinogenesis. Although radon-related lung cancers are mainly seen in the upper airways, radon increases the incidence of all histological types of lung cancer, including small cell carcinoma, adenocarcinoma, and squamous cell carcinoma.

An individual's risk of getting lung cancer from radon depends mostly on three factors: the level of radon, the duration of exposure, and their smoking habits. Either smoking or radon exposure can independently increase the risk of lung cancer; however, exposure to both greatly enhances that risk.

## RISKS OF DEVELOPING LUNG CANCER FROM RADON

The risks are greater for smokers and those exposed to second-hand smoke. The lifetime risks listed in the table on the following page represent the risks of developing lung cancer due to radon exposure and for smokers the combined risk of tobacco use and radon exposure.

Non-smokers exposed to radon at the new guideline level of 200 Bq/m<sup>3</sup> have a 2% lifetime chance of developing lung cancer. For a smoker, this risk increases to 17% at 200 Bq/m<sup>3</sup>.

## LIFETIME RISKS TO A SMOKER EXPOSED TO RADON

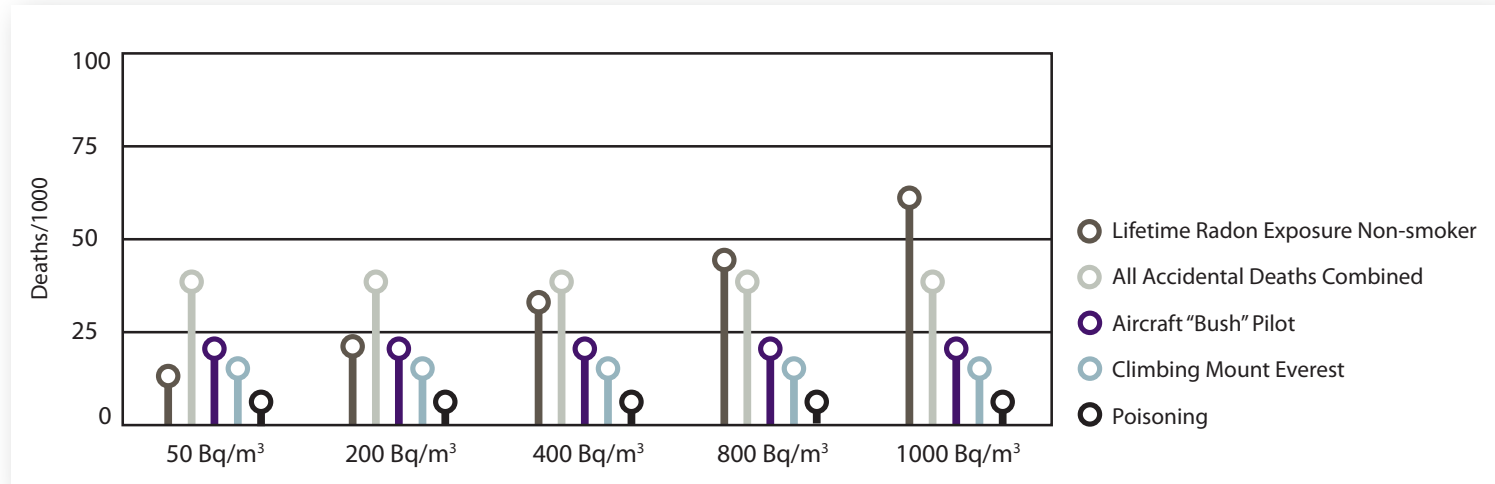
Lung cancer risk for lifetime exposure to radon at 800 Bq/m<sup>3</sup> **30%**  
Lung cancer risk for lifetime exposure to radon at 200 Bq/m<sup>3</sup> **17%**  
Lung cancer risk from smoking only **12%**

(Source: Report of the Radon Working Group on a New Radon Guideline for Canada)

## LIFETIME RISKS TO A NON-SMOKER EXPOSED TO RADON

Lung cancer risk for lifetime exposure to radon at 800 Bq/m<sup>3</sup> **5%**  
Lung cancer risk for lifetime exposure to radon at 200 Bq/m<sup>3</sup> **2%**  
Lung cancer risk for exposure to radon at low outdoor levels **1%**

The chart below illustrates that the risk for a non-smoker at 800 Bq/m<sup>3</sup> is higher than for all common accidental deaths (motor vehicle accidents, drownings, falls, fire and more) combined. We take precautions against accidental deaths by putting on our seatbelts, wearing lifejackets or ensuring that our smoke detectors are working – we should also be testing our homes for radon!



## RADON IS EASY TO DETECT AND REDUCE IN A HOME

There are several methods that can be used to test a dwelling for radon. There are inexpensive “do it yourself” radon detectors available that measure radon levels for short periods of time (typically used for 2 to 7 days), and others that are for long term testing (3 to 12 months). Since the radon concentration inside a home varies over time, measurements gathered over a longer period of time are likely to give a more accurate picture of the radon exposure. Health Canada recommends that homes be tested for a minimum of three months, ideally during the winter months.

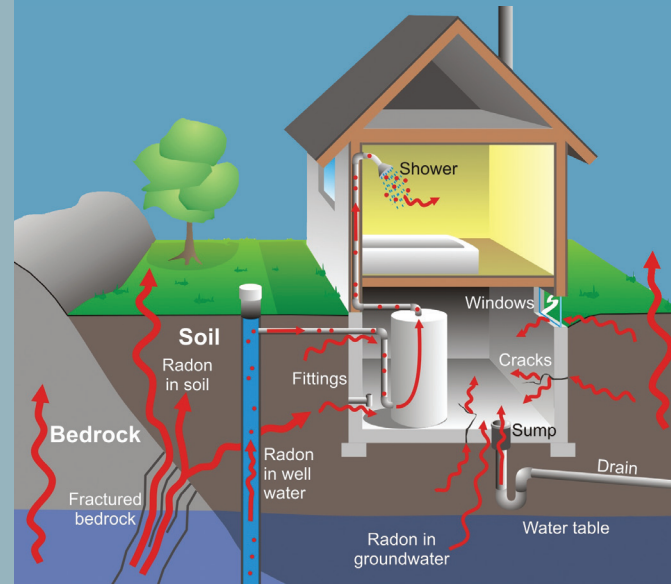
Radon test devices are available over the internet from a limited number of Canadian companies and several US-based service providers. You may also find test devices in local hardware or home building supply stores.

## MINIMIZING THE RISK

Health Canada’s research suggests that high radon levels are not widespread in Canadian homes. However, it is difficult to predict the level in any one home. If your patients are concerned about exposure to radon gas in their home, they should have their home tested, and take the following steps to reduce their risk:

- If they are a smoker, they should quit smoking.
- If they have tested the air in their home and their radon level is above the recommended guideline, they should take action to lower the level as soon as possible.

## HOW CAN RADON GET INTO MY HOME?



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## MOST RADON PROBLEMS ARE EASILY RESOLVED

If a radon test shows levels above the guideline of 200 Bq/m<sup>3</sup>, the following steps may help to reduce the level of radon:

- Increase the mechanical ventilation, via a heat recovery ventilator (HRV), to allow an exchange of air.
- Seal all cracks and openings in foundation walls and floors, and around pipes and drains.
- Paint basement floors and foundation walls with two coats of paint and a sealant.
- Ventilate the basement sub-flooring by installing a small pump to draw the radon from below the concrete slab to the outside before it can enter your home (obtain the help of an experienced contractor).
- Renovate existing basement floors, particularly earth floors.

Homeowners may want to hire a contractor to perform the necessary mitigation or remediation. Contractors should have the necessary certification from an accredited organization. Health Canada recognizes the Canadian certification program, *Canadian National Radon Proficiency Program (C-NRPP)*, offered jointly through the *National Environmental Health Association (NEHA)* and the *American Association of Radon Scientists and Technologists (AARST)*, [www.neha-nrpp.org/cnrpp.shtml](http://www.neha-nrpp.org/cnrpp.shtml). C-NRPP is the credentialing body that will administer and operate the program in accordance with their program policies.

## HEALTH CANADA'S ROLE

Health Canada has taken a number of steps to protect Canadians from the potential dangers of radon gas. These include education and awareness about radon and the associated health effects, establishing measurement techniques and protocols, conducting research into effects of radon exposure and developing guidelines.

## WHERE CAN I LEARN MORE?

Visit the Health Canada Web site [www.healthcanada.gc.ca/radon](http://www.healthcanada.gc.ca/radon) or call 1 800 O-Canada (1 800 622-6232), TTY – 1 800 926-9105.

Health Canada and the Canada Mortgage and Housing Corporation (CMHC) have produced a booklet called *Radon – A Guide for Canadian Homeowners*. For a copy, visit the CMHC Web site [www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca) or call 1 800 668-2642.