Radon Testing and Remediation Programs: What Works?

July 2008

National Collaborating Centre
for Environmental Health

Centre de collaboration nationale
en santé environnementale

This document was produced by the National Collaborating Centre for Environmental Health at the BC Centre for Disease Control with funding from the Public Health Agency of Canada, and was reviewed by members of the NCCEH reference group.

Photo credits: DivaNir4a; licensed through iStockphoto

National Collaborating Centre for Environmental Health
400 East Tower
555 West 12th Avenue
Vancouver, BC V5Z 3X7

Tel: 604-707-2445
Fax: 604-707-2444
contact@ncceh.ca
www.ncceh.ca

Production of this report has been made possible through a financial contribution from the Public Health Agency of Canada. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

ISBN: 978-0-9784317-7-8

Introduction

Local, regional, and national health authorities have used a number of approaches to encourage homeowners to test for radon and to implement remediation measures where warranted. Given Health Canada's new 200 Bq/m^3 radon guideline, the time is right to review lessons learned in implementing testing and remediation strategies.

Testing and remediation programs

Education campaigns:

- Education may be effective at raising the public's knowledge and awareness of radon, but this does not necessarily lead to a decision to test or remediate[1].
- In response to guidelines alone, few households choose to test, and fewer remediate: A 1990 nationally representative survey of US residents who had heard of radon (n > 40,000) found that 5% tested their home; among those with test results greater than 148 Bq/m^3 (the US guideline), 28% mitigated[2].
- Households tend to remediate when test results indicate higher concentrations: A 1988 Washington, DC study found that mitigation was conducted in 2% of dwellings with test results below 148 Bq/m^3 (the US guideline), 5% of dwellings with results between 148 and 740 Bq/m^3, 32% of dwellings with results between 740 and 1,750 Bq/m^3, and 40% of dwellings with results over 1,750 Bq/m^3.[3]

Cost-sharing incentives:

- These subsidize the cost of testing and/or remediation.
- Typically this type of program is ineffective at encouraging homeowners to remediate: An Iowa program offering free screening tests (but no subsidy for remediation) found that among 60 households with radon concentrations over 740 Bq/m^3, 11% had implemented remediation measures within three months, 12% were prepared to take action within one year, and 29% planned to remediate in the future[4].

Radon testing disclosure at the time of real estate transactions:

- This promotes radon testing through the mandatory/voluntary disclosure of testing and results at the time of real-estate transactions.
- In California, sellers must disclose if their property has been tested for radon, and if so, the concentration. Buyers have a right to hire a certified professional to conduct the test. Testing is based, at a minimum, on two short-term (48-hour) tests, which may be conducted simultaneously in the home[5].
- This type of program results in a large proportion of the housing stock being tested, but reliance on short-term tests may lead to inappropriate conclusions regarding the need for remediation, especially for homes at or just above the guidance value: A study of 1,449 randomly selected homes across 21 American states, found that as the measured concentration of radon increased from 149-184 Bq/m^3 to ≥ 370 Bq/m^3 the proportion of homes where remediation was inappropriately recommended (based on an action level of 148 Bq/m^3) decreased from 56% to 5%[6].

Building code: New home construction

- Radon mitigation measures may be incorporated into the construction of new homes.
- Such measures may include installation of a plastic vapour barrier below the foundation slab, or construction of a sub-slab ventilation system (National Research Council 2005).
- The National Building Code of Canada 2005 recommends that the construction of new homes include radon mitigation measures (National Research Council 2005). These measures are applied variably across Canada and within provinces.
- Mitigation during new building construction is expected to lower the radon exposure for the entire population, as opposed to screening and remediation, which would affect only those whose homes have the highest radon concentrations.

Summary

- While public information does change knowledge and awareness of the risks of indoor radon, neither informational campaigns nor financial incentives have been successful in attaining high levels of participation in indoor radon remediation programs.

- Approaches for indoor radon mitigation based on new building construction programs are successful and recommended.

Useful resources

Health Canada. 2006. Report of the radon working group on a new radon guideline for Canada. REV. 03-10-2006. March 10, 2006.

Canadian Mortgage and Housing Corporation. 2007. Radon, a guide for homeowners. ISBN 0-662-25909-2.

References

1. Weinstein ND, Klotz ML, Sandman PM. Promoting remedial response to the risk of radon: are information campaigns enough? Sci Technol Hum Val 1989;14(4):360-79.

2. Eheman CR, Ford E, Staehling N, Garbe P. Knowledge about indoor radon in the United States: 1990 National Health Interview Survey. Arch Environ Health 1996;51(3):245-7.

3. Doyle JK, McClelland GH, Schulze WD, Elliott SR, Russell GW. 1991. Protective response to household risk: a case study of radon mitigation. Risk Anal 1991;11(1):121-34.

4. Field RW, Kross BC, Vust LJ. Radon testing behaviour in a sample of individuals with high home radon screening measurements. Risk Anal 1993;13(4):441-8.

5. California Department of Public Health (CDPH). Radon program (indoor radon). [Online]. 2007 [cited 2008 Apr 7]; Available from: URL:www.cdph.ca.gov/healthinfo/environhealth/Pages/Radon.aspx.

6. White SB. Making mitigation decisions based on short-term tests of 222Rn. Health Phys 1994;67(2):180-2.

Feedback Form

Please provide your comments below.

Document Name:

Radon Testing and Remediation Programs: What Works?

Is this document useful for your work? Why or why not?

_____

_____

_____

_____

_____

_____

How could this document be improved?

_____

_____

_____

_____

_____

_____

What is your occupation? _____

Your name: _____

How did you obtain this document? _____

Please mail or fax this form to:

National Collaborating Centre
for Environmental Health
400 East Tower
555 West 12th Avenue
Vancouver, BC V5Z 3X7

Fax: 604-707-2444