Radon Testing and Remediation Programs: What Works?

July 2008

National Collaborating Centre for Environmental Health
Centre de collaboration nationale en santé environnementale
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 $\geq 370$ 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


References


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