Surveillance of environmental & occupational exposures for cancer prevention

From communication to mitigation: the challenges of managing radon exposure in Canada

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Statistic Canada: Households able to correctly describe radon gas (%)
Households* (%) that have tested for radon gas†

*As a percentage of all households that did not live in an apartment and had heard of radon

†Survey notes to use data with caution, z
Why so few people testing?

- They aren’t aware of the problem?
  - This is accurate, HOWEVER….
    - 1989- Weinstein et al.
      “[New Jersey] Respondents proved well informed, but radon levels were not highly correlated with any of the response variables. Over optimism was more common than overreaction.”

- Even when they know about radon, most didn’t perceive it to be a risk
The Radon conundrum

“Interestingly, the deep fears and anxieties associated with radiation do not seem to extend to naturally occurring radiation… a survey in a region characterized by very high radon levels in many homes, found people who were basically apathetic about the risk
-From Slovic 2012 (Sandman et al., 1987).”

Most people are afraid of radiation, perhaps radon isn’t understood as radioactive…

- Canadian lack of awareness (1991!) due to government’s historical approach to managing radon
- Government chose not to publicize 1977 survey of 14,000 homes
  - Didn’t encourage testing till much later
- Dr Roger Eaton (Health and Welfare Canada) high profile quotes-
  - “As we say, you can’t tame nature: you just have to live with it”
  - “…until everybody stops smoking, there not much point in spending money…on techniques to reduce radon in homes
Canada vs. US

- Canadian officials initially felt US EPA had overestimated risk
  - Decided not to elevate radon issue across Canada
  - “Not worth disturbing the public given that the risk is such a small one” Health and Welfare statement
Where are we now?

- We need to increase both *knowledge of* and *concern about* radon

- We still need to get people to test their homes and mitigate if necessary
Rethinking radon communication

Re-introducing radioactivity
It’s a “radioactive gas”
Re-thinking naturally occurring?

- Winnie Cheung et al 2013, Bill Angel, and others- human-made problem

- REFRAME issue to be building-oriented
  - The housing design makes radon a risk
Other strategies being tried

- Make it noticeable:
  - Radon alarm - goes off at a certain level
    - Similar to concept of CO detector
    - Makes what is invisible at least audible

Cloud Chamber - Health Canada
Increasing agency involvement

- Health Canada has developed a substantive radon platform
  - Not all provinces have followed suit
    - E.g. National building code

- **Problem too large for one agency**
  - Provincial and municipal governments need to get involved
  - Better citizen based groups
    - Starting in some parts of the country

- Canadian Association for Radon Scientists and Technicians created (CARST)
Better Media coverage

- The media shapes how the general public views risks
- How has media coverage of radon functioned in Canada?
  - Begun small study at SFU
- Initial radon coverage discussed the problem as “radioactive”
- 1990s show a period of “questioning” science
- Coverage tapers off late 1990s, early 2000s
  - Other things pushed radon off the agenda
Radiation found in wells near Kingston

Makin, Kirk


ProQuest Historical Newspapers: The Globe and Mail (1844-2011)

pp. 4

Radiation found in wells near Kingston

By KIRK MAKin

Well water surveys in a small township near Kingston, Ont., have turned up high concentrations of radioactive elements in domestic wells.

The substances, discovered in well water in Front of Essex Township, occur naturally in water-holding rock found in the three adjoining counties - Lambton, Kent and Essex.

Dr. John Goddard, medical officer of health for the three counties, said it is "highly unlikely" that water testing in the township and a five-year water study of all three counties may be started after Front of Essex's immediate problems are dealt with.

Such a study would probably give more health records in Ontario if there has been an increased incidence of cancer, Dr. Goddard says.

Radioactivity concentrations up to seven times the provincial limit have been found in a study of Front of Essex wells by a Queen's University team.

The team found that the concentrations rose from 35,000 picograms per litre to 800 picograms per litre in the five-year period.

About 100 of the area's 600 wells have been tested, most of these by the Health Ministry, and reinforcements in coastal areas have been placed.

Dr. Goddard added that the well problems will be detected because records may have been dismissed the first time the tests were done.

There was also concern that well water samples might be tampered with before they reached the laboratory.

Mr. Thompson said he is resigned to the government's role in testing, "but others still want Queen's to do it.

Dr. Hodgkinson said the government is capable of doing reliable testing, "but don't buy their (the minister's) arguments at all," he said.

The government has requested Queen's University involvement in testing water.

It recently sent a reply to the Health Ministry saying the public doesn't trust any level of government to do the studies. Dr. Hodgkinson said.

One resident who said readings for radiation and uranium in his well were well over the guidelines said, "People here are afraid; the government will end up saying, 'Oh, the levels are acceptable. If they are, then why have they advised us not to drink the water?'

The man, who requested anonymity, said the well is far water at nearby Brockville.

"So far there is a pattern of no pattern," Dr. Hodgkinson said. Readings have fluctuated from well to well and at varying sites. "We've seen things that are unusual, such as a high reading at one well," he said.

The government's role in testing, he said, "is definitely nothing to inspire confidence," he said.

The discovery has focused attention on the potential dangers of radiation that might not be acceptable for Dr. Stankel 1920.

"Sometimes we all act as if we have our days to blame. But we're at a loss on this one - we have to deal with God."

There are other areas in North America where natural radiation levels are high, said Dr. Elliot Lake, a Northern Ontario area, where some homes are specifically vented to stop the buildup of airborne particles.

Dr. Stankel said waterborne radon can be reduced by agitation, but radon is much more difficult to remove.

Studies at Queen's show that most water supplies of Brockville and Kingston before it flows from the tap - probably because of agitation during the filtration process.

He had no knowledge of any tests for radon in these cities.

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Taking the risk out of radon
MICHEL SMITH SPECIAL TO THE GLOBE AND MAIL
*The Globe and Mail (1936-Current); Apr 16, 1994;
ProQuest Historical Newspapers: The Globe and Mail (1844-2011)*
pg. D8

TWENTY years have passed since North America got its first big scare about radon, the odourless, colourless, radioactive gas that seeps into houses from concrete, bricks and soils, and may inflict grave illness on householders.

Now, a Canadian research project has concluded there is no detectable cancer risk from household radon. Indeed, there's even a suggestion that the small doses found in homes may increase resistance to cancer. The 10-year analysis, to be published later this year, is the most ex-
Yukoners urged to test homes for radon

Radioactive gas a leading cause of lung cancer among Canadians

CBC News  Posted: Nov 16, 2015 2:17 PM CT  |  Last Updated: Nov 17, 2015 1:22 PM CT

"You can't really tell it's in your house until you test," said Erik Simanis, one of 7 newly-trained radon mitigation specialists in Whitehorse. (CBC)

Yukon health officials and housing authorities are warning people about the dangers of radon gas and urging them to protect themselves.

Tests done over the past 20 years show the concentration of radon in Yukon homes is among the highest in Canada. Of a thousand Yukon homes that have been tested, at least 30 per cent exceeded Health Canada safety standards.

Almost 10 per cent have shown dangerously high levels of the radioactive gas.

"It causes cancer," says Catherine Elliott, Yukon's deputy medical officer of health. "I think we've known for a long time that radioactivity causes cancer in tissues, and radon is a radioactive gas that you breathe into.

"Radon is for real," said Yukon's deputy medical officer of health, Catherine Elliott. "It causes cancer." (CBC)

Dr. Roberta Bondar, the first Canadian woman in space, is warning Canadians about the dangers of radon gas in homes and its very serious links to lung cancer.
How to get people galvanized?

- Reframing of messages
- Governments and NGO leadership
- Improve media coverage
  - Maybe radiation professions can help journalists reclaim the issue

**BUT - we need CHANGE not just awareness**

- Precaution Adoption Process:
  - Weinstein and Sandman (1992)
  - Research done in the US during the 1980s
  - 2 phases
Radon Framework: First Phase

Key Features of this Phase:
- Raising Awareness
- Encouraging Testing
- Providing access to test kits

Tools needed: informational resources, persuasive campaigns, targeted outreach in high radon regions
Radon Framework Phase 2

Knowledge to Action

Receive Test Results
- If low, remediation not required

If Results are High
- May choose not to remediate *

Decide to remediation
- May have challenges that prevent remediation*

Remediation
- Follow-up, maintenance

Key Features of this Phase:
- Helping citizens interpret test results
- Recognizing people’s rights to NOT remediate
- *is more persuasion key at this point?
- Decisions to remediate can be hampered, e.g. $, time

More help needed on these fronts
Precaution Adoption Process: Weinstein and Sandman (1992)

- Factors associated with testing and remediate
- Other People’s Behavoir (peer influence high)

“If the Jones’s’s tested, maybe I should…”
What gets people to test for radon?
Nissen et al 2011

<table>
<thead>
<tr>
<th>Variable</th>
<th>response</th>
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<tbody>
<tr>
<td>Concern for health</td>
<td>47%</td>
</tr>
<tr>
<td>Concern for children’s health</td>
<td>17.6%</td>
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<tr>
<td>Realtor recommended it</td>
<td>19.6%</td>
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<tr>
<td>Free/cheap test kit</td>
<td>17.6%</td>
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<tr>
<td>Concerned about property value</td>
<td>7.6%</td>
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<tr>
<td>Doctor recommended it</td>
<td>3%</td>
</tr>
</tbody>
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**Predictive Model Variable**
- Higher Education
- Higher Income
- Non or ex-smokers

This intervention research found that of those with higher than regulatory levels, less than half were going to remediate.

**Cost** was the main factor cited for not remediating.
In conclusion

- Majority of Canadian aren’t aware of radon
- Work on messaging
  - *Radon: the worse thing you never heard of”*
  - “Radioactive gas”
- We need to work together
  - Multiple agencies and communities
- We need to **help people move through the process**
  - Giving out test kits isn’t enough
  - Support for remediation
  - Reducing exposure is key
ED WAS A REGULAR GUY.

ED WORRIED ABOUT THE GREENHOUSE EFFECT. ABOUT THE OZONE LAYER.

AND ABOUT FOULED BEACHES. AND PESTICIDES IN FOOD.

THE WORLD WAS TOO DANGEROUS, ED DECIDED.

SO HE NEVER WENT OUT AGAIN. ED STAYED IN HIS HOME.

AND THE RADON GOT HIM.