Radon and Child Care Facilities

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Overview of talk

• Review of radon exposure during childhood
  – Rational for testing
• Interior Health Authority Child Care radon testing research
• Policies to reduce childhood exposures
• Ethical considerations
• Conclusion
Radon causes cancer

- IARC known human carcinogen - Lung Cancer
- Other cancers?
  - Leukemia and lymphomas
    - Studies of children and adults
    - Studies designs mostly correlation or case-control
      - 2017 county level data supports relationship between leukemia and radon
    - Large (140,000) US prospective study found association for radon and blood cancers for women only
      - Exposure measurement still a problem
  - Stomach cancer
    - Only correlation studies to date
Children and radon- does age matter?

Due to lung shape and size differences, children have higher estimated radiation doses than do adults. Children also have breathing rates faster than those of adults.

Risk of lung cancer in children resulting from exposure to radon may be almost twice as high as the risk to adults exposed to the same amount of radon.

If children are also exposed to tobacco smoke, the risk of getting lung cancer increases at least 20 times. https://www.atsdr.cdc.gov/csem/csem.asp?csem=8&po=7

Conflicting statements: Health Canada and US EPA don’t support the above statement
Reducing risk - Early Life exposure

Exposure assessment

• Where do children spend time?
  – At home (most people spend ~90% of time indoors)
  – Childcare facilities
    • Majority of families use childcare (54%) for children less than 4
    • Hours in care: 60% use at least 30 hours or more per week

• Exposure pathways: Infants and toddlers
  – Greater exposure to floor regions: crawling, sleeping
  – Childcare centres often at ground or underground level
    • Churches, offices, homes
USA Radon testing in daycares

- Radon testing compulsory in:
  - Connecticut
  - Florida
  - Iowa
  - Illinois
  - Idaho
  - Michigan
  - New Hampshire
  - New Jersey
  - Rhode Island

LawAtlas Project, Temple University, as of Dec 2016
Daycare testing in the Canadian context

• BC Interior Health Authority most engaged
  – Received funding from Health Canada to initiate
  – Most comprehensive testing program to date

• Test kit program started 2013
  – 2010 introductory letter suggesting testing- no uptake
  – Radon detector/letter from Senior MHO encouraging Operators take advantage of free test kits
  – Repeat/reminder letters mailed out

• Mailed out 853 kits
  – 46% of facilities responded and have results
Radon levels known to be elevated in homes in Interior Health Region

Highest home to date: Slocan Valley (Rental)
- Basement 37,000 Bq/m³
- Main Floor 7,800 Bq/m³

Post Mitigation by IRPS Ltd.
- Basement 29 Bq/m³
- Main Floor 22 Bq/m³
Methods: Child Care deployment kit

Packages for facilities included:

- Basic radon info
- Step-by-step instructions
- Random duplicates & spikes
- 91-days minimum,
- Seal, return in postage-paid envelope,
- BC Lung building envelope survey
- Contact number for questions
Quality Assurance

Tests returned to the health unit
Results of Childcare radon testing categorized by radon level

- WHO Action Level
- Health Canada Action Level

- 25% >100
- 11% >200
IHA Childcare Facilities Pre- and Post-Mitigation

![Bar chart showing radiation levels before and after mitigation.](chart)

- **Before** and **After** radiation levels are compared across different locations (H1 to H7).
- The chart highlights a significant reduction in radiation levels after mitigation, with some locations showing negligible change.
- The threshold for concern is indicated at 200 Bq/m³, with most locations below this level post-mitigation.
Results Letter mailed to facilities

• Numerical results, Where the test was done
  – Impetus to remediate if necessary

• Describe guidelines
  – Health Canada (200 Bq/m³)
  – WHO (100 Bq/m³)
  – ALARA concept

• HC mitigation guidance timelines
  – 200-600
  – >600 Bq/m³
Results letter- continued

• Provided links to resources
  – Mike Holmes mitigation website
  – Health Canada general/ C-NRPP- find a professional remediation
  – Interior Health

• Encouraged retesting after 5 years
  – Or renovations

• Copy of results letter sent to building or agency owners to raise awareness and promote testing
  – School Districts,
  – First Nations Band,
  – Corporate Owner, NGO, etc.
Remediation methods: Sub-Slab Depressurization

Proven mitigation method
Catch radon & dump outside
Low wattage fan
Sub-Slab Depressurization continued

Works well in many building envelope situations
New testing requirements for IH child care centres

• May 2017 newsletter informing at child care facilities that radon testing required

• Requirement of licensing
  – Using Community Care and Assisted Living Act

• New and existing care facilities must test

• Licensing Officers in the field now asking operators about testing

• On-going dialogue about testing and mitigation
Ethical considerations

- **Access** - does testing for radon decrease access to quality care?
  - Not necessarily - there is a practical solution

- **Affordability** - will testing for radon make childcare more expensive?
  - Reality - radon isn’t that expensive test for
  - Often child care operators are not building owners

- **Equity** - should some children have safer environments than others?
  - Unlicensed childcare would still pose an issue
Natural justice?- Radon maybe naturally occurring, but the way we build isn’t...
Policy level

• Requirements for testing in daycares
  – general state laws (USA)
  – public health (Yukon)
  – regional Health Authority licensing requirements

• Policies need to include
  – Prescriptive methods for
    • Testing
    • Remediation if necessary
    • RETESTING- small changes over time can alter levels

• Policies need champions
In summary

• Children maybe more vulnerable to radon than adults
  – Still no consensus but biologically plausible
• Reducing exposure **early** means less **lifetime exposure**
  – Good idea for cancer prevention
• Implied “safety” of child care centres
• Requiring testing is not onerous
  – Solution is effective and straightforward
• Leadership is key- testing initiatives require policy
  advocates- maybe its YOU!
THANK YOU!

For more information, please visit the NCCEH Radon Topic Page, or reach out!

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https://www.interiorhealth.ca/YourEnvironment/RadonGas/Pages/default.aspx

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