

Indoor Air Quality

Improving Indoor Air Quality - Yukon Housing Corporation – Building
Trades and Professionals

Whitehorse, Yukon April 28th, 2016



YOUR HEALTH AND SAFETY... OUR PRIORITY.

Why the indoor environment is important.

- Spend approximately 90% of our time indoors depending on:
 - Age
 - Medical conditions
- Higher concentration of air pollutants
- Air-tight indoor environments
- Acute and chronic health effects

Vulnerability to indoor air pollutants

- The most vulnerable to exposure to air pollution
 - Children
 - Rapid development of the body and body organs
 - Developing lungs and body defence systems
 - Inability to effectively breakdown (liver) and eliminate (kidneys) toxic substances from the body
 - Close to the floor (source of contaminants)
 - More time spent indoors
 - Expecting moms
 - Developing foetus



Vulnerability to indoor air pollutants

- The most vulnerable to exposure to air pollution
 - Existing medical conditions
 - Lungs (Respiratory)
 - Heart (Cardiovascular)
 - Diabetes
 - More time spent indoors
- Seniors
 - Weakened body defence systems and lung function
 - Weakened ability to breakdown and eliminate toxic substances from the body
 - More time spent indoors



Health effects of air pollutants

- Examples of air pollution related health effects
 - Allergies
 - Asthma
 - Chronic Obstructive Pulmonary Disease
 - Cardiovascular Diseases



Indoor air pollutants

- The common indoor air pollutants are:
 - Biological
 - moulds
 - Chemical
 - Volatile Organic Compounds
 - Carbon Monoxide
 - Nitrogen Oxides
 - Particulate matter
 - Radon

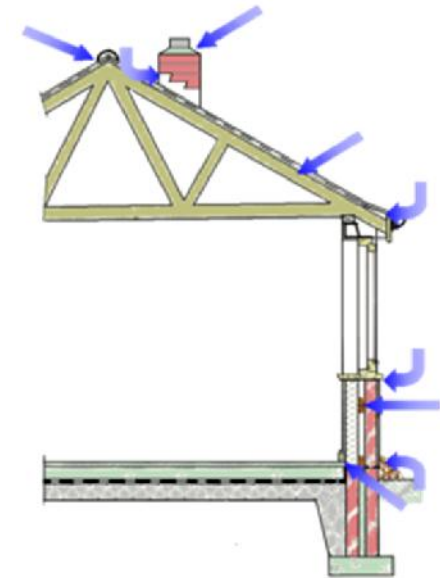
Indoor air pollutants

- Biological indoor air pollutants
 - Moulds
- Moisture problems lead to mould growth and structural damage
- Three examples of how to prevent mould growth and structural damage
 - Keep rain, snowmelt, groundwater out and prevent plumbing leaks
 - Prevent condensation
 - Use materials that tolerate water



Indoor air pollutants

- Moisture control - Keep rain, snowmelt, groundwater out and prevent plumbing leaks
 - Water can impact water sensitive materials for example
 - During construction
 - Pooling runoff-water
 - Wet building material
 - Due to leaks through roof, wall, windows, doors, sump etc.
 - Poor site drainage
 - Due to plumbing leaks



Indoor air pollutants

- Moisture control - Keep rain, snowmelt, groundwater out and prevent plumbing leaks
 - Preventing water entry
 - Site drainage
 - Wet building material finishing
 - Inspection and storage of moisture sensitive building materials
 - Rain and snowmelt interception
 - Prevent plumbing leaks
 - Sump



Indoor air pollutants

- Moisture control by preventing condensation
 - Main activities indoors that generate moisture in the air
 - Cooking
 - Showering and Bathing
 - Laundry
 - Condensation can occur
 - On interior surfaces of exterior walls
 - Cold water piping/toilet tanks



Indoor air pollutants

- Moisture control by preventing condensation
 - To control condensation
 - Manage moisture sources
 - Vapour/air barrier and insulation
 - Cold water pipes



Indoor air pollutants

- Moisture control
 - Areas where some surfaces are designed to get wet
 - Kitchen
 - Baths
 - Laundry room
 - To prevent moisture damage and mould growth
 - Use materials that tolerate water
 - Tiles
 - Stones
 - Etc.



Indoor air pollutants – Volatile Organic Compounds

- Volatile organic compounds – Flooring- Carpets
 - VOC emission from new carpet
 - Acetone
 - Toluene
 - Xylene
 - Factors influencing the off-gassing
 - Carpets as “sink” for air pollutants.



Indoor air pollutants – Volatile Organic Compounds

- Volatile organic compounds – Flooring- Carpets
 - To reduce occupants exposure to VOC emissions
 - During installation ventilate
 - Install during warm weather
 - Carpet to purchase
 - Materials used for installation
 - Use other flooring

Indoor air pollutants – Volatile Organic Compounds

- Volatile organic compounds - Paints
 - Sources of VOC emission
 - Paints
 - Paint thinners
 - Paint strippers
 - To reduce occupants exposure to VOC emissions
 - During painting ventilate
 - Paint during warm weather
 - Avoid spray-painting
 - Use less toxic paints



Indoor air pollutants – Volatile Organic Compounds

- Volatile organic compounds – Particle boards
 - Sources of VOC emission
 - Urea formaldehyde resin (used in the manufacture)
 - Source of formaldehyde emission and other VOCs (contact with water releases formaldehyde)
 - To reduce occupants exposure to VOCs
 - Use solid wood products
 - Softwood plywood (use moisture stable resins – therefore low VOC emission)



Combustion by-products

- Examples of combustion by-products
 - Carbon monoxide
 - Nitrogen oxides
 - Sulphur dioxide
 - Particulate matter
 - Volatile organic compounds
- Sources
 - Gas, wood and oil appliances



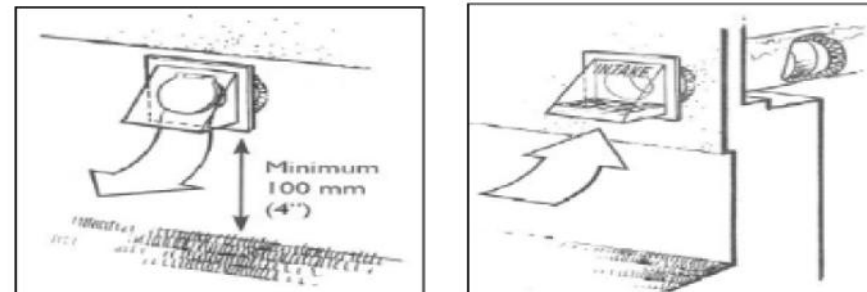
Combustion by-products

- Examples of combustion by-products
 - To reduce occupants exposure to combustion by-products
 - Ventilation
 - Prevent air leaks from appliances
 - Certification
 - Supply air for combustion



Ventilation System as source of indoor air pollution

- Heating and ventilation
 - Movement of indoor air pollutants within the building
 - Multi-purpose building
 - Introduction of outdoor air pollutants
 - Air intake locations/protection
 - Duct system
 - Leaks
 - Contamination during construction
 - Prevent HVAC as source of air pollutants
 - Air intake away from pollution source
 - Prevent entry of pests
 - Proper duct sealing
 - Protect from contamination



Source: Canada Mortgage and Housing Corporation (CMHC). Complying With Residential Ventilation Requirements In The 1995 National Building Code. All rights reserved. Reproduced with the consent of CMHC. All other uses and reproductions of this material are expressly prohibited.

Attached Garages

- During occupancy, activities in the garage that would impact the indoor air quality:
 - Idling vehicle inside the garage
 - Starting a snow-blower or lawnmower in the garage
 - Storage of gasoline in the garage
 - BBQ
- Potential air pollutants
 - Carbon monoxide
 - Benzene
 - Other VOCs
- Prevent pollutants entry from garage
 - Ensure no air leak through the
 - Wall
 - Door
 - Install a garage fan



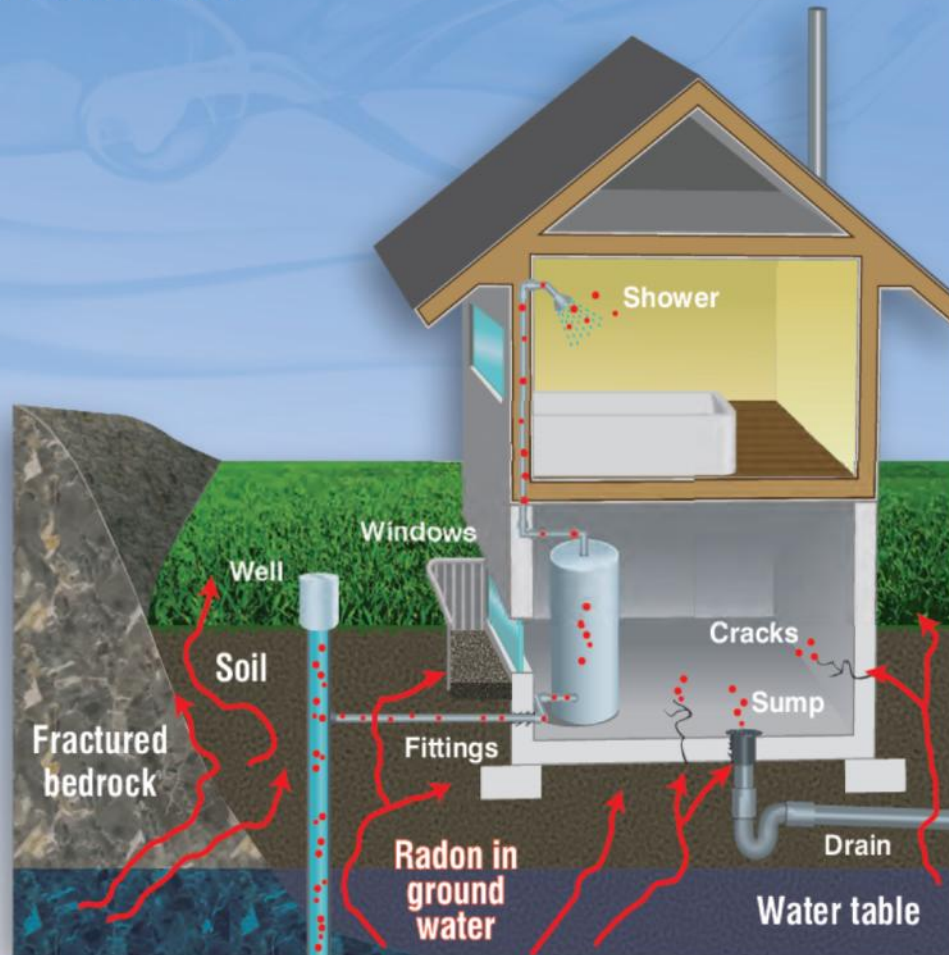
Radon Gas

How does radon enter a home?

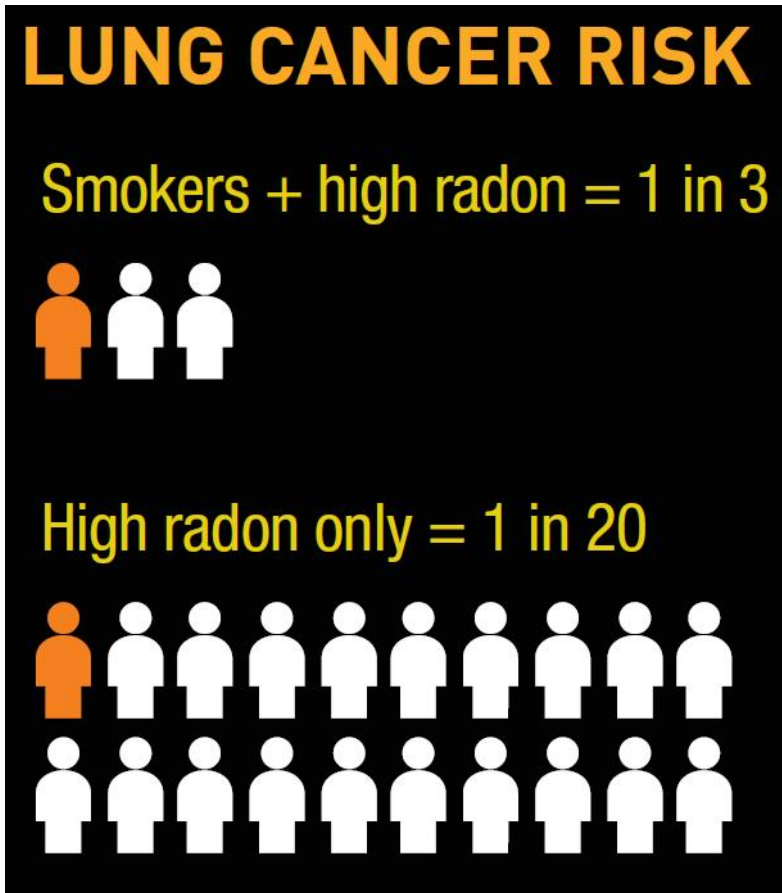
Radon can enter via cracks in the foundation walls and/or floor slabs. It can also enter through other openings, including:

- unfinished floors (dirt);
- construction joints;
- gaps around service pipes;
- support posts;
- window casements;
- floor drains;
- sumps; and/or
- cavities inside walls.

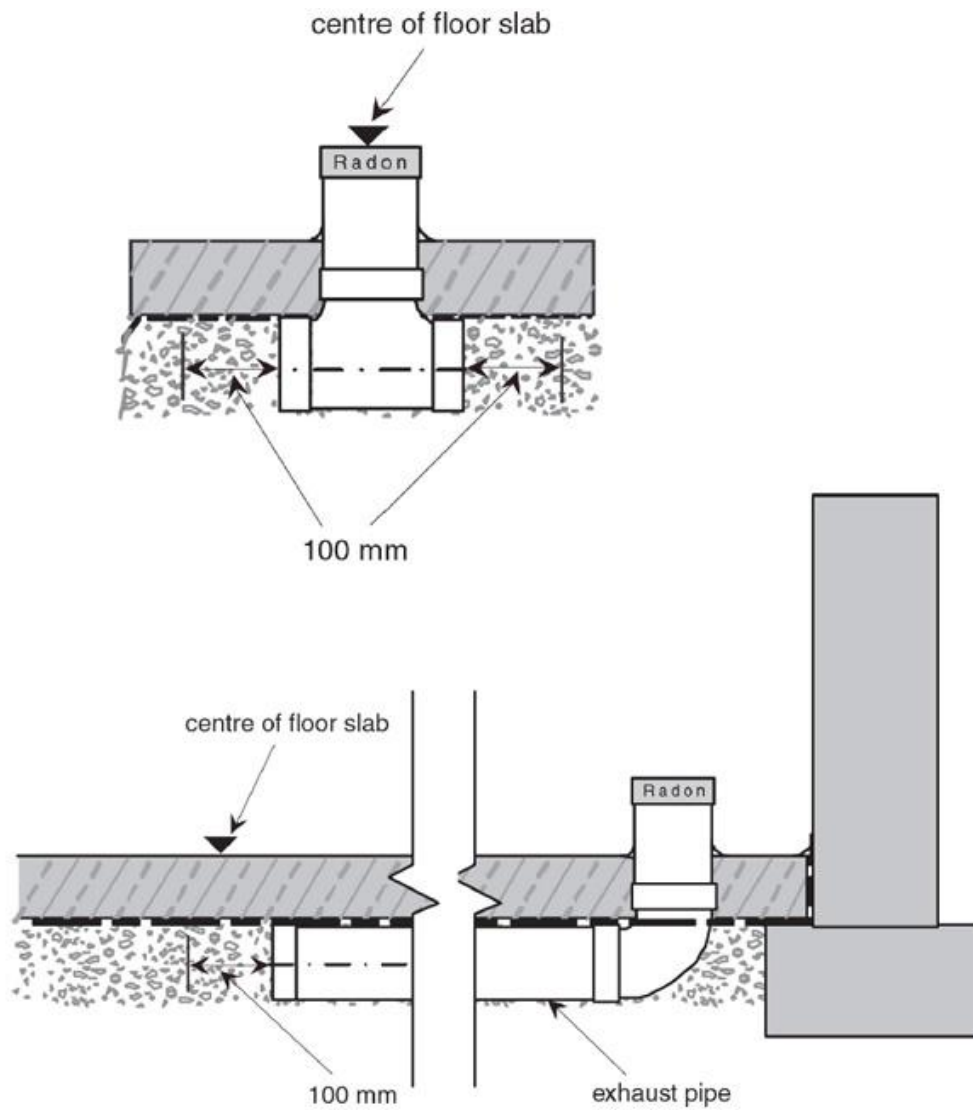
Indoor radon levels are the result of a number of interconnected factors including the property's bedrock type, soil type, soil moisture level, seasonal freezing and thawing activity and the home's design, construction and use.



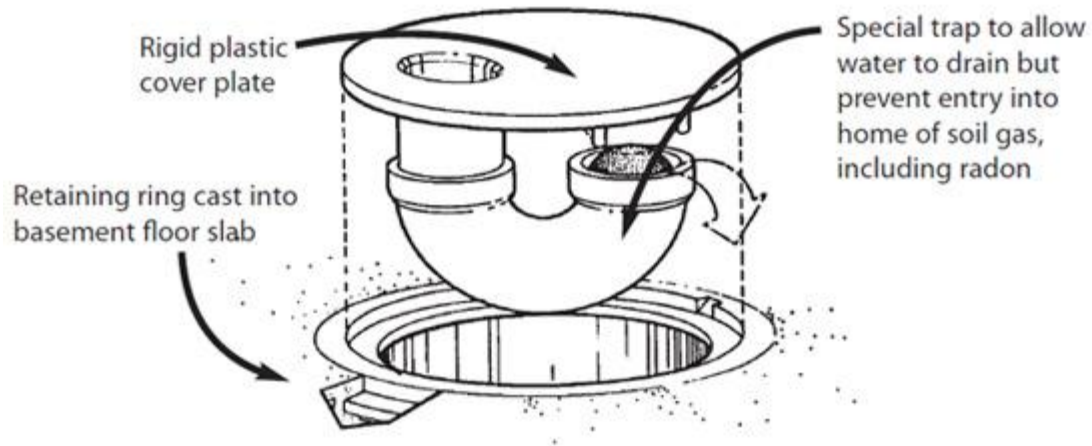
Radon – Health Effects



National Building Code Canada



Floor drain and Sump pits



Radon Mitigation



Questions

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