Radon Exposure among Construction Workers in Canada: A Scoping Review

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BACKGROUND

- Radon is a colourless and odourless radioactive gas released from the breakdown of uranium in the ground (Lorenzo-González et al., 2019).
- After being inhaled, it can damage lung cells leading to the development of lung cancer (Lorenzo-González et al., 2019).
- Radon levels are highest near its sources such as soil or rocks and in enclosed spaces with poor ventilation—conditions that workers in the construction industry often encounter while engaged in excavation, basement work, and underground activities etc. (Barros-Dios et al., 2007).
- Despite these factors and the well known health effects of radon exposure, limited research has been done to examine radon exposure in construction workplaces in Canada, with most of the focus being on residential settings like homes.

OBJECTIVE

- In this scoping review we examine the current literature on radon exposure among Canadian construction workers including aspects such as exposure levels, worker perception and awareness, and safety practices. The review aims to identify gaps in knowledge and inform future research and occupational health policies.

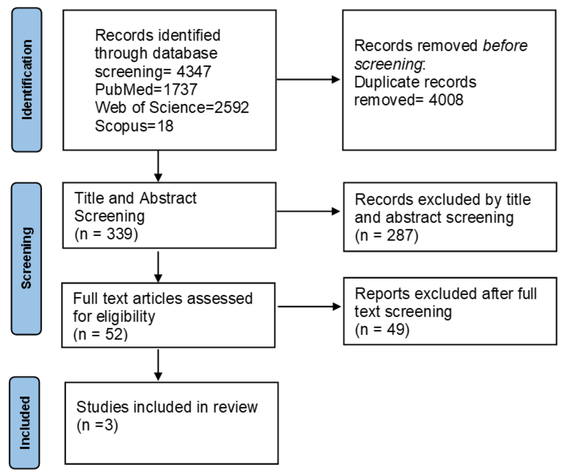
METHODS

Databases: PubMed, Web of Science, Scopus

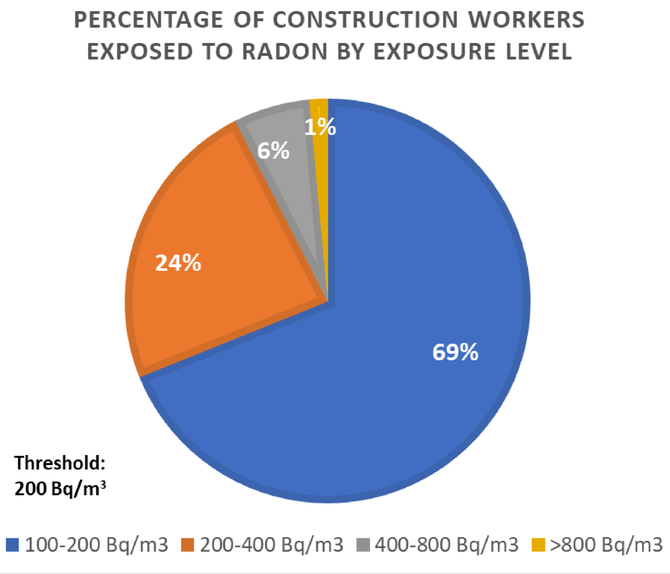
Keywords: construction, construction workers, construction industry, building contractor, electricians, plumbers, steamfitters, pipefitters, carpenters, excavators, bricklayers, crane operators, radon, radon exposure and Canada

Study Selection: Inclusion criteria required studies to report any aspect of radon exposure at construction workplaces in Canada including exposure levels, mitigation strategies, health outcomes, risk perceptions and awareness. Studies that did not involve construction workers, focused on construction workers outside of Canada or investigated radon exposure in construction workers in mining were excluded from this review.

RESULTS



Study	Location	Radon Concentration (Bq/m³)	Threshold (200 Bq/m³)
Chen (2021)	Canada	34	Lower than threshold
Yang et al. (2024)	Ontario, Canada	32.3 Range:7-63	Lower than threshold



DISCUSSION

- Two of the studies reporting average indoor radon concentrations at construction workplaces to be below the national threshold of 200 Bq/m³ suggests that there may not be an immediate risk to the health of construction workers. Although, it is still important to note that no level of radon exposure is considered safe and even low concentrations of radon have been positively linked to lung cancer (Health Canada, 2016; Kim et al., 2019).
- In contrast, results from another study which reported around 10, 790 construction workers across Canada being exposed to radon concentrations exceeding the threshold value of 200 Bq/m³ indicates that a significant number of construction workers are exposed to dangerous levels of radon.
- Additionally, 4600 or 42% of the workers exposed to levels beyond the threshold being building equipment contractors illustrates that certain jobs within the construction sector are at a greater risk of radon exposure and highlights the need for targeted measure for certain subgroups.

Knowledge Gaps:

- There is a lack of data on how radon exposure varies across different subgroups within the construction industry which prevents us from identifying high risk vs low risk groups.
- There is also lack of research on different aspects of radon exposure including construction workers' perceptions and knowledge of radon risk.

FUTURE DIRECTIONS

- Studies need to investigate radon exposure levels for different jobs such as excavators, pipefitters, electricians etc. within the construction industry as certain jobs may have higher or lower risk of exposures depending on the nature of their work.
- Additional research needs to assess construction workers' knowledge, attitudes and perception of radon risks to inform development of targeted education and training programs.

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