

A symmetric, balanced understanding of Canadian residential housing radioactive radon gas exposure.

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Over the past year, we have integrated 42,500+ residential radon gas readings with administrative housing, regional, and population information within the 2021 Canada Census to establish a clear understanding of Canadian radon exposure within the residential built environment. This work is important as 1 in 5 lung cancers (110,000 cases since 2001) arise in Canadians who have never smoked tobacco, with the most common non-tobacco lung cancer trigger being repetitive inhalation of radon gas. Radon is a prevalent radioactive carcinogen in the Canadian residential built environment, and emits mutagenic and cancer-causing particle radiation. We lead the public *Evict Radon National Study* and *Carcinogen Exposure (CAREX) Canada* projects that couple knowledge translation with data analytics on cancer-causing environmental exposures. Using our pan-Canadian cohort of long term residential radon test outcomes (linked to highly detailed property and human demographic data), we have normalized all findings to the key administrative human and housing statistics assembled by *Statistics Canada* to produce an appropriately weighted understanding of radon exposure across Canada. Canadian residential radon data are now symmetric by region, property design type, and/or community types (across the urban to rural paradigm).

The outcomes of this work are forming the basis of the next (once-per-decade) Cross Canada Radon Report, produced in collaboration with key stakeholders such as Health Canada, and to be released in 2024. Completion of our CIHR Healthy Cities program-funded project goals (and knowledge translation outcomes) have been essential for this report, which will inform physical, social and policy interventions required to mitigate lung cancer risks attributable to radon inhalation within the Canadian built environment. We are advancing health outcomes by addressing one of the most prevalent built environment-based health threats to our current and future communities.