Spatial Knowledge and Information CANADA: Integrating residential radon surveys in British Columbia

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Human exposure to radon-222, an odourless and colourless radioactive gas, is recognized as the second leading cause of lung cancer globally and has been estimated to be responsible for over 3,000 lung cancer deaths per year in Canada. Naturally occurring through radioactive decay of uranium-238, airborne radon is typically diluted by atmospheric mixing to low concentrations. However, when radon escapes into poorly ventilated buildings, concentrations accumulate. Human exposure to relatively high radon concentrations over time can result in the formation of lung cancer. In British Columbia, five separate residential radon surveys have measured indoor radon concentrations throughout the province over a period of twenty years in independent, uncoordinated attempts to gauge the health risk posed by radon. The goal of this research is to integrate radon surveys into a single provincial dataset on indoor radon concentration. The integrated data sets will be used as input for mapping spatial variation in indoor radon levels and is the first step towards building a predictive model of indoor radon risk for British Columbia.

The five available datasets for residential radon concentrations are provided in tabular form by the British Columbia Center for Disease Control (BCCDC) and include surveys conducted by the BCCDC, the Northern Health Authority, the British Columbia Lung Association, Health Canada and one private contractor. With the exception of having the common intent of recording indoor average radon concentrations, each survey was executed with different objectives and over different time periods, resulting in each having varying geographic extents, sampling design, spatial resolution, and relevant attributes recorded. Using common attributes and geographic indexing, data will be integrated and variability in information content of each contributing dataset explored. Integrated data will be used for statistical modeling of the spatial distribution of indoor radon gas based on housing characteristics and the physical environment. Mapping will be used to guide the development of policy for radon, such as building codes to ensure construction foundations are adequate to minimize radon exposure.