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Letter to the Editor

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# Radon and stomach cancer

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We read with great interest the recent paper by Messier and Serre in which they reported their analysis of the radon content of drinking water and its potential effect on stomach cancer.[1] They observed that radon contained in underground water might be a risk factor for stomach cancer.

The International Agency for Research on Cancer declared residential radon a human carcinogen in 1988 because of its effect on the onset of lung cancer, but very few studies have assessed its possible role in other neoplasms.[2] The World Health Organization handbook on indoor radon, published in 2009, does not highlight any associations with other cancers but neither does it exclude them.[3] Although the highest quantity of alpha radiation from short-lived decay products of radon is received by the lung, other organs such as the skin are also exposed. Radon diluted in drinking water might induce cancers of the stomach, kidney or ureter.

In January 2016, we reported for the first time a higher risk for stomach cancer due to residential radon.[4] We used an ambispective cohort design and our results were adjusted by gender, age, smoking status (never smokers, ex-smokers, current smokers), pack-years, age at initiation of smoking, rurality index, municipal income and municipal illiteracy rate.[4] We calculated a hazard ratio of 10.8 (95% CI, 1.2–98.0) for participants exposed to a radon concentration of 50 $Bq/m^3$ or higher compared with lower exposures. Our results should be interpreted with caution because our cohort was small (2127 participants) with only 12 incident stomach cancer cases through follow-up. Although our findings were limited by a low number of cases, we observed a strong and significant association between residential radon and the incidence of stomach cancer. We did not analyse the effect of radon in drinking water.

Inhaled radon and radon diluted in water could reach the cells in the stomach wall in different ways, although the mechanism of action of radon from both sources would likely be the same. Radon dissolved in water might be more risky for stomach cells because the stomach is a storage organ and exposure might be prolonged. Inhaled radon could also act on the stomach, as the dosimetric approach used to quantify the risk of stomach cancer due to radon exposure in miners supports this association.[5]

Other gastrointestinal organs might also be susceptible to cancers due to radon exposure. Ecological research by our group observed a positive and significant correlation between residential radon exposure and oesophageal cancer mortality in men.[6] It would be very interesting to examine whether there is any association between oesophageal cancer and radon present in drinking water.

We believe that the results of both our findings[4,6] and those of Messier and Serre[1] provide valuable information that should inspire further research to definitively confirm or refute the association between radon exposure and

stomach cancer (and other cancers). Case–control or cohort studies should be performed to confirm this association. If confirmed, additional preventive actions directed to mitigate or reduce radon exposure should be enforced.

## References


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