

New EPA Radon Risk Map Motivates Household Testing¹

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INTRODUCTION

Radon is a naturally occurring gas that is present throughout Ireland. Exposure to it is a leading cause of lung cancer, yet the rate at which householders undertake tests is consistently low. Our aim was to test two approaches for motivating people to test for radon: (1) providing them with general information about radon and (2) enabling them to find the level of risk in their area using a hazard map. We used a controlled experiment to test whether designing the map using principles from the psychology of risk altered willingness to test for radon.

DATA AND METHODS

A representative sample of adults (N = 1,700) took part in the online experiment. It consisted of three tasks. The first task was a quiz about the causes and consequences of radon exposure and how to remediate against it. Half of participants were selected at random to see the answers after making their guess. This experiment tested whether giving information about radon altered responses to measures recorded later in the study.

In the second task, we initially recorded perceived risk of radon on seven-point rating scales. Risk perception was measured through questions about general worry about radon, perceived likelihood of being affected by it and perceived severity of the consequences if affected. Participants were then given a link to a radon hazard map depicting the estimated level of risk in different areas. Participants were randomised to see the pre-existing map which was in use by the EPA at the time of the study or one of sixteen test maps. These test maps varied by four features informed by the psychological literature on risk perception: (1) how

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the risk was described (as a numeric frequency, e.g. “1 in 5 homes at risk”, vs. simple statement, e.g. “high risk”), (2) the number of risk categories (two vs. three), (3) the colour (yellow-red vs. yellow-black), and (4) the search functionality (Eircode searching vs. not).

In the third task, we measured evaluation of the maps, perceived risk from radon again and the participant’s willingness to test to their home for radon.

RESULTS

Participants who saw the answers to the knowledge quiz reported being more worried about radon and judged that the effects of exposure would be worse for them or someone in their household compared to those who didn’t see the answers. Despite most not knowing the level of risk in their area, participants in both groups believed their home was not likely to be affected.

Map evaluations were more positive for ones that used the simple statement of risk, three categories rather than two, the yellow-red colour scheme and search functionality.

All test maps boosted perceived risk relative to the pre-existing map, but the size of the difference depended on the design of the map. Statistical models showed that general worry about radon and perceived likelihood of being exposed to it were higher among those who saw maps with the numeric frequency (e.g. 1 in 5 homes at risk) and three categories of risk. Map design did not affect perceived severity of consequences from exposure. Importantly, the numeric frequencies also resulted in higher willingness to test for radon.

The most influential map showed risk as a numeric frequency, displayed risk over three categories, used a yellow-red colour scheme and allowed Eircode searching. Compared to the pre-existing map, it resulted in a 72% increased in those highly willing to test. Note that the best performing map was not the map that was most liked by participants.

CONCLUSION AND IMPLICATIONS

Awareness of the perceived risk from radon can be improved by a strategy that provides households with more information and uses numeric frequencies to communicate risk statistics. Map design had a large effect on willingness to test for radon, implying that the pre-existing map should be replaced with the best-performing one. The EPA has since adopted this as their main radon map, available at <https://www.epa.ie/environment-and-you/radon/>. More broadly, the results show the benefit of controlled experimental testing of communications about environmental issues.