Societal attitudes and behaviours towards Radon indoors in Slovenia: Findings from a RadoNorm Survey

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RadoNorm in collaboration with Slovenian Radiation Protection Administration

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Executive Summary

Objectives of the study

This study reveals the findings of the Slovenian RadoNorm survey, which is an integral component of a larger study that investigates societal attitudes and behaviors related to radon. This extensive research project, known as the "RadoNorm European Radon Behavior Atlas," encompasses 15 European Member States.The rresults presented in this report offer important insights into the Slovenian public's understanding, attitudes, and behaviour regarding radon.

The objectives of this study are as follows:

i) To gauge socio-psychological factors that could influence people's behavior regarding protection from radiological risks associated with radon, using a survey;

ii) To examine which of these factors are associated with actions such as radon testing and mitigation;

iii) To offer empirical evidence that can guide awareness and communication strategy aimed at increasing the number of radon tests and mitigations.

Iv;) Additionally, the study explores potential disparities in radon awareness, attitudes, and behaviors between regions in Slovenia categorized as high and moderate radon risk areas and those identified as low radon risk areas.

In particular, the following 27 socio-psychological aspects, grounded in different health protection and risk communication theories, were investigated:

Radon protection behaviour, Intention to protect from radon, Radon awareness, Salience, General radiation knowledge, Radon knowledge, Risk perception, Confidence in authorities for risk management, Knowing radon stakeholders, Truthfulness of radon stakeholders, Competence of radon stakeholders, Severity, Susceptibility, Response efficacy: remediation, Self-efficacy, Perceived behavioural control: financial and other burdon and ease, Esthetic impact of remediation works on a dwelling, Economic impact of radon on a property value, Subjective norms, Descriptive norms, Health effect perception, Stigma, Information processing, Information comprehensiveness, Information uncertainty, Affective response to information, and Preference for post-survey radon related information.

Method and data

The study utilized Computer-Assisted Web Interviewing (CAWI) to survey a sample of the Slovenian population. The panel consisted of 25,000 potential respondents included in the panel of a marketing company MEDIANA, from which respondents for this study were randomly selected. The final sample included 2,012 respondents, representative of the (18+) Slovenian population in terms of gender, age, and region, with stratification based on the total number of inhabitants in Slovenia. The response rate was 27.6%. Of the respondents, 77.5% lived in low radon risk areas, 14.2% lived in medium risk areas, and 8.3% lived in high risk areas. The questionnaire had an average duration of 19 minutes and were conducted between November 29th and December 8th, 2022. The questionnaire included a short video providing basic information about radon and the mitigation of high radon levels in a dwelling. By showing the video selectively, we aimed to provide relevant information to those who needed it most in order to respond heuristically to questions related to attitudes, feelings, and opinions. To ensure high quality, a

pilot study with a sample size of 300 was conducted before the field work[1], followed with panel members selected randomly with a sample size of 264 (a soft launch).

Radon protection behaviour: Do people in Slovenia test and mitigate?

It is highly recommended by Slovenian authorities that owners and residents of dwellings, especially those in high radon risk areas, test for radon levels in their homes. If the results exceed the national reference level of 300 Bq/m^3, immediate remedial action should be taken. Unfortunately, our survey results show that only 8.6% of respondents living in high radon risk areas reported testing their dwellings for potential radon concentration, compared to 2% of respondents in low radon risk areas.

Out of the 69 respondents in our sample whose dwellings were tested for radon concentrations, 22% (N=8) living in high radon risk areas reported that the radon levels in their dwelling exceeded the national reference level and further actions were required. In low radon risk areas, 23% (N=6) of respondents reported exceeded levels of radon in their dwellings. These findings emphasize the importance of testing radon concentrations, as 22% of dwellings tested in high radon risk areas pose a health risk. It is worth noting that our results are consistent with previous reports, as authorities have reported that up to 30% of tests conducted in radon priority areas exceed the national reference level.

When asked all resopondents in the survey whether them or someone else had taken action to remediate their current residence for radon, 7 respondents in the all Slovenian area stated, that their building was remediated after discovering a radon problem, and 53 respondents stated that radon protective measures were integrated in their home during a building process. Among the 60 respondents who were aware of mitigation a action to reduce high radon concentrations in their dwelling, most relied on natural ventilation methods, such as regularly opening windows to ventilate their living spaces, instead of installing sustainable technical solutions. However, some respondents did install ventilation systems, such as forced ventilation, heat recovery, or air-to-air exchange. Notably, technical solutions like installing a radon membrane were used only in a few cases
Overall, these findings suggest that evidence based, strategic and theory based intervention campaigns may be needed to encourage and support more residents in high and moderate radon risk areas to take mitigation action, and that further research is needed to determine the effectiveness of different mitigation strategies. It would be worthwhile to delve deeper into how people understand "natural ventilation" and whether their perception of it provides sufficient protection against radon in a home.

Selected statistical results:

- A Pearson chi-square test was conducted to assess the association between remediating buildings in low radon risk area and remediating buildings in middle and high risk arees (here refered as high risk area). The test statistic, $p < .001$ indicates a statistically significant association between the radon areas, with a very low probability that the observed association is due to chance.
- Only 8.6% of respondents in high radon risk areas reported testing their dwellings for radon, compared to 2% in low risk areas.
- Of the 69 respondents whose dwellings were tested, 21,6% (N=8) in high and moderate risk areas and 23,1% (N=6) in low risk areas reported exceeded levels of radon.

[1] Tanja Perko, Catrinel Turcanu, Ferdiana Hoti, Peter Thijssen, Melisa Muric (2021): RadoNorm pilot study report from public opinion survey, Belgium 2020-2021, RadoNorm, Belgium DOI:10.20348/STOREDB/1174/1251

- 4.6% of participants in high and moderate radon risk areas took action to remediate their residence for radon, compared to 2.5% in low risk areas.
- Most respondents used natural ventilation to reduce high radon concentrations in their dwellings, while technical solutions like radon membranes were used only in a few cases.

Intention to protect from radon: What is the public willingness to adopt radon protection measures in Slovenia?

Investigating the intention to test and mitigate radon levels is important, given that only a limited number of residents actually engage in these behviours. In addition, intention can be used as a proxy for actual behavior. The study found that the level of compliance with an advice to test and remediate for radon is low, regardless of whether the area is high and medium-risk or low-risk. Over 60% of respondents expressed no intention to test radon concentrations in their homes if advised. Moreover, only 30% of respondents in high and medium-risk areas and 25% in low-risk areas intended to measure radon in their home as a precaution. These results indicate that residents exhibit a low level of protective behavior when it comes to radon testing and mitigation. Moreover, 40% of the population may not follow the advice to remediate, which suggests that increasing mitigation rates is even more challenging than increasing radon testing rates. Last but not least, the aforementioned intentions to test and mitigate are probably even overestimated somewhat, because those with low initial radon knowledge, were exposed to an informational video.

Selected statistical results:

- Both high and medium-risk and low-risk areas show low compliance with the advice to test and remediate for radon.
- More than 60% of respondents strongly disagree, disagree, or are neutral about the statement "I intend to test radon concentrations in my home if advised."
- Only 30% of respondents in high and medium risk areas and 25% in low-risk areas agree with the statement "I intend to measure radon in my home as a precaution."
- 40% of the population indicated that they did not intend to follow advice for remediation, indicating that increasing mitigation rates is even more challenging than increasing radon testing rates.

Radon Awareness: Are people in Slovenia aware of radon?

The study distinguishes between radon awareness and radon knowledge. Radon awareness is the state of being conscious of radon, while radon knowledge is the information and understanding a person has acquired about radon. The study found that the majority of respondents (74.21%) were aware of radon, but a quarter of the population (24.5%) was not aware of it. The analysis of radon awareness by geographical position showed only minor differences between low, medium, and high radon risk areas. Medium risk areas had the highest level of awareness, while high risk areas had less respondents reporting knowledge of radon.

Unfortunately, the results demonstrate that there is a lack of consistency between being aware of radon and following the advice to test and mitigate if advised. For example, out of the 20% of respondents who reported being aware of radon, only approximately one-third of them would test their homes if advised, while another third would definitely not test, and the remaining third were neutral. This highlights that being aware of radon does not guarantee a corresponding action to protect against it.

Selected statistical results:

- 74.21% of people in Slovenia report being aware of radon.
- The level of awareness about radon risks is not significantly higher in areas with high or middle radon risk compared to other regions of Slovenia.
- 95% of those respondents who reported having no knowledge were also not confident in their knowledge related to radon. For those who had heard of radon, only 6% were highly confident in their knowledge, with 69% not very confident. Among those who claimed to have a lot of knowledge about radon, 39% were confident in their knowledge, while 21% lacked confidence, and 40% were indifferent.
- The correlation analysis shows a strong negative association between lower awareness and confidence in knowledge related to radon ($r = -.614$, $p = .001$)
- Out of those respondents who reported being aware of radon, only approximately one-third of them would test their homes if advised, while another third would definitely not test, and the remaining third were neutral.
- Pearson's correlation coefficient between "radon awareness" and "intention to protect from radon" indicated that while there was a statistically significant, but very weak association between the two variables ($r = .089$, $p < .001$, $N = 1690$).

Salience: Is radon indoor seen as an important topic in Slovenia?

The term "salience" refers to the level of importance or relevance that an individual or group assigns to the topic of radon. "Salience" has been measured as (dis)agreement with the statement "Radon may be a problem, but I haven't paid much attention to it because there are more important things to deal with". The results suggest that radon risk is not a high priority issue for most people in Slovenia, with every second person agreeing that radon could be a problem but that is not a pressing issue. It is surprising to note that there were no significant differences observed between individuals residing in low, medium, or high radon risk areas in their prioritisation of the radon risk.

We found that individuals who prioritize other issues over radon may have lower intention to test and mitigate against radon exposure. This is based on a significant negative correlation between agreement with the statement "Radon may be a problem, but I haven't paid much attention to it because there are more important things to deal with," and "intention to test and mitigate" for radon.

Selected statistical results:

- More than 50% of respondents agreed that radon could be a problem, but that had not paid much attention to it as there were more pressing issues. 36% neither agreed nor disagreed, and 13% strongly disagreed or disagreed with the statement.
- The results revealed a statistically significant but very weak negative correlation between lower salience, meaning a greater focus on other priorities than radon, and higher confidence in knowledge about radon ($r = -0.087$, $p = 0.001$, $N = 1552$).

General radiation knowledge: How much people in Slovenia know about ionizing radiation?

To effectively communicate the risk of radon and protective actions with the general population, it is important to assess their general knowledge related to radioactivity and ionizing radiation. The analysis of survey results indicates that the general population has limited knowledge regarding exposure to radiation risks. Of particular concern is the significant proportion of individuals who hold the misconception that "Exposure to radiation always leads to radioactive contamination." This misinformation could present a challenge, particularly in understanding a difference between radiation and irradiation in relation to radon. (Radiation is the emission of energy in the form of waves or particles, while irradiation is the process of exposing an object or substance to radiation). This lack of understanding has significant implications for ensuring safety and preventing harm from ionizing radiation. However, the study also revealed a higher level of knowledge among the general population concerning the concept of decay, as many knew that every radioactive substance becomes less radioactive with time. This finding is encouraging as it suggests that some foundational knowledge of ionizing radiation potentially exists among the population.

Selected statistical results:

- 53.83% of the population thinks that exposure to radiation always leads to radioactive contamination, 22.61% of the respondents knows that this is not true and 23.56% chose not to respond.
- 29.97% of the population knows that the human body is naturally radioactive, 33.30% selected the wrong response, and 36.73% preferred not to answer.
- 46.27% of respondents know that with time, every radioactive substance becomes les and les radioactive.

Radon knowledge: How much people in Slovenia know about radon?

This study also aimed to assess the level of radon knowledge among the public in Slovenia. Radon knowledge refers to the understanding a person has acquired about the risks associated with radon exposure through learning, experience, or campaigns. A total of 1493 respondents out of a sample of 2012 who indicated that they knew or heard about radon were asked to respond to 11 statements related to radon exposure.

Overall, respondents demonstrated relatively high knowledge related to radon-related topics, with 92% of people in high radon risk areas correctly recognizing that radon is an invisible gas. This fact is also well known among residents in medium and low radon risk areas. Additionally, 89% of respondents across all areas in Slovenia were aware that the risk from radon exposure increases with longer exposure periods. More than 80% of respondents in all radon risk areas also correctly identified that testing is the only way to determine if a home has an elevated radon level. Overall, people demonstrated relatively high knowledge across seven items measuring radon-related knowledge. From this perspective, we can conclude that Slovenians have relatively high knowledge about radon, with individuals from high radon risk areas tending to provide the most accurate responses while those in low and medium risk areas lag slightly behind.

Unfortunately, the study disclosed some important knowledge gaps. The results showed that respondents had a low level of understanding regarding the symptoms of radon exposure, with only

10% correctly identifying that radon does not cause headaches. The study also found that up to 52,9 % of people in Slovenia are not familiar with Becquerel per cubic meter, the unit used to measure radon concentration levels indoors. Only 30.7% of respondents correctly answered that radon concentration in a room is measured in Becquerel per cubic meter. Moreover, only half of the respondents were aware that radon is linked to lung cancer.

Important to acknowledge is a weak but significant association between knowledge and intention to test and mitigate indicates that other factors beyond knowledge may play a more substantial role in shaping respondents' intentions to test and mitigate.

Selected statistical results:

- 52,9% of people in Slovenia are not familiar with the unit of measurement of radon concentration Becquerel per cubic meter. Only 47.1% of respondents correctly answered that radon concentration in a room is measured in Becquerel per cubic meter, while most people admitted to not knowing the answer.
- Only 14,3% correctly identifying that radon does not cause headaches. Of the participants, 34.2% provided an incorrect answer, while more than half (51.5%) did not respond.
- 66.7% of individuals residing in high radon risk areas correctly answered that high radon concentrations are expected in the basement than the attics. This knowledge was lower in medium radon risk areas at 56.8%, and even lower in low radon risk areas at 48.7%.
- Despite the regular communication of the message that "radon is the second leading cause of lung cancer" by authorities and in various communication interventions, 37% of Slovenians are still unaware of the health effects of radon exposure.
- Looking at all the "school tests" applied in this survey, we can see that 57% of the respondents (out of a sample size of 2012) demonstrated a moderate level knowledge about radon by answered at least six of the radon knowledge questions correctly. A lot of people (18,5%) demonstrated relatively high knowledge about radon as they responded correctly to ten or eleven questions out of 14 questions (general radiation knowledge and radon knowledge test).

Risk Perception: How do people in Slovenia perceive radiological, radon and other risks?

This part of the study explores how individuals perceive different types of risks, including radiological and non-radiological risks. The aim is to provide a more comprehensive understanding of radon risk perception by examining it in the context of multiple risks.

The findings showed that respondents perceive a high level of risk across all items, with environmental pollution having the highest mean score and greatest perceived risk. The risk perception for an accident at the Krsko nuclear power plant was relatively low, with only 34.9% of respondents rating it as a very high or high risk.

The study found that the perception of radon risk among respondents varies depending on how the risk is presented. "Indoor air pollution due to radon" was perceived as the most risky among the radon related risks, followed by "The presence of naturally radioactive gas radon indoors" and, "Natural radiation from the soil or from space" which is perceived as the least risky among the radon related risks. The study investigated the effect of different formulations, or framing, of radon on risk perception in-depth. The data suggested that respondents perceive the radon risk formulated as "indoor air pollution due to radon" slightly higher than the radon risk formulated as "the presence of the naturally radioactive gas radon indoors". Specifically, 31.1% of respondents rated the risk as high or very high for the "indoor air pollution

due to radon" statement, while only 26.4% of respondents rated the risk as high or very high for the "presence of the naturally radioactive gas radon indoors" statement.

However, looking at the association between the different formulation of radon risk and intention to test and mitigate, demonstrated that the formulation "the presence of the naturally radioactive gas radon indoors" has a slightly stronger association than the formulation "indoor air pollution due to radon", suggesting that risk perception based on the latter formulation may be somewhat less strongly associated with intention to test and mitigate for radon compared to the former formulation.

Based on the study's findings, there was a significant positive correlation between respondents' perception of radon risk (combining both formulations) and their intention to test and mitigate for radon. This suggests that individuals who have a higher perception of radon risk may be more likely to take action and test and mitigate their dwellings for radon. These findings suggest that other factors besides risk perception must also play a significant role in people's decision to test for and mitigate radon.

Radon, communicated as "Indoor air pollution due to radon" receives the highest risk perception by the respondents and “natural radiation from the soil or from space" received the lowest risk perception rating by the respondents, where as “"the presence of the naturally radioactive gas radon indoors" was perceived in between the two other formulations.

Hence, the way in which radon risk is presented influences how people perceive the risk, but it doesn't always result in a corresponding increase in their willingness to test for and mitigate the risk.

The study uncovered a paradox in the relationship between "radon risk perception" and "intention to test and mitigate". Despite perceiving the formulation of radon risk as " indoor air pollution due to radon the presence of the naturally radioactive gas radon indoors" as higher than other formulations, the results indicate that the formulation of radon risk as "indoor air pollution due to radon the presence of the naturally radioactive gas radon indoors " is strongly linked to the intention to test and mitigate”.

These findings can inform communication strategies how to convey the risks associated with radon exposure, thereby encouraging more people to test and mitigate their dwellings in case of high levels of radon.

Selected statistical results:

- The survey involved 2012 respondents who were asked to evaluate their risk perception related to mine risk areas, using a 6-point Likert scale with options varying from "no risk at all" to "very high risk."
- The risk domain with the highest mean score and greatest perceived risk by the respondents is environmental pollution, with a mean of 4.76 and 64.5% of respondents rating it as a very high or high risk. Similarly, the climate crisis was perceived to be a high risk for health in the next 20 years, with a mean of 4.57 and 57.2% of respondents rating it as a very high or high risk.
- The risk perception for radioactive waste was also relatively high, with a mean of 4.0 and 41.3% of respondents perceiving it as a very high or high risk. In contrast, the risk perception for the accident at the Krsko nuclear power plant was relatively low, with only 34.9% of respondents rating it as a very high or high risk, while 46.2% of respondents considered it to be no risk or a very low/low risk (with a mean of 3.75 and SD of 1.56).
- The perception of radon risk among respondents varies depending on how the risk is presented. "Indoor air pollution due to radon" received the highest average score (3.75) among 939 respondents, followed by "The presence of naturally radioactive gas radon indoors" with an average score of 3.57 among 935 respondents. On the other hand, "Natural radiation from the soil or from space" received the lowest average score (3.28).
- There was a statistically significant but low positive correlation between respondents' perception of radon risk (combining both formulations) and their intention to test and mitigate for radon. The Pearson's correlation coefficient ($r = 0.263$, $p < 0.001$, $N = 1587$).

Confidence: To what extent do Slovenians have confidence in their authorities' ability to manage risks?

This part of the study focused on the confidence dimension and measured it for authorities undertaking actions to protect the population against risks from nine different sources, including radon.

Results showed that the lowest confidence in authorities was related to the climate crisis and environmental pollution, while the highest confidence was related to an accident in a nuclear installation and the use of ionizing radiation for medical tests or treatments.

Among the radiological risks, the lowest confidence was related to using recycled building materials with low levels of radioactivity and indoor air pollution due to radon, while the highest confidence was related to an accident in a nuclear installation and the use of ionizing radiation for medical tests or treatments. The study also found that respondents had similar attitudes towards the two differently framed radon-related risk items, with an overall confidence of 52-53%. However, the number of respondents who did not respond to the question, because it was to difficult for them to formulate an opinion, varied for each item with the most difficult item for respondents related to natural radiation from soil and space.

Selected statistical results:

- The lowest confidence in authorites to manage the risk is related to climate crisis (62% have no or (very) little confidence with a mean of 3,06, SD 1,19) and environmental pollution (60% have no or (very) little confidence with a mean of 3,10, SD 1,14). The highest confidence among these domains is for an accident in the nuclear installation (68% have moderate or (very) high confidence with a mean 3,95, SD 1,36) and for the use of ionizing radiation for medical tests or treatments (65% have moderate or (very) high confidence with a mean of 3,81, SD 1,26).

- Among the radiological risks, the lowest confidence is related to using recycled building materials with low levels of radioactivity (50% stating they have no or (very) little confidence with a mean of 3,37, SD 1,19), indoor air pollution due to radon, (49% have no or (very) littlconfidence with a mean of 3,41, SD 1,19), and the presence of the naturally radioactive gas radon indoors (47% have no or (very) little confidence with a mean of 3,44, SD 1,21). Furthermore, the population shows the highest confidence among these radiological risks in the domains of an accident in a nuclear installation (68% stating they have moderate or (very) high confidence with a mean of 3,95, SD 1,36) and in the use of ionizing radiation for medical applications.

Trust: Who is considered the most trustworthy stakeholder in Slovenia when it comes to radon-related matters?

The concept of trust is complex and multidimensional, and in order to better understand it in the context of radon-related risk, we measured trust using three dimensions: confidence, trustworthiness, and competences.

The survey revealed that trust is a multi-dimensional concept that encompasses various aspects, such as knowing the stakeholder, as well perceptions of their technical competence, and their ability to tell the truth about radon risks. The Institute Jozef Stefan emerges as the most trusted stakeholder in radon

risk management in all three domains of stakeholder familiarity, truthfulness, and technical competence, according to this study. The results also showed that health authorities are well-known but not considered the most competent or trustworthy stakeholders regarding radon. In contrast, scientists from universities and the Radiation Protection Administration are relatively well-known, and their competences and trustworthiness are also recognized. The lowest level of trust was placed in contractors for remediation, such as builders and companies measuring radioactivity. The findings suggest that stakeholder familiarity, truthfulness, and technical competence are all critical components in establishing trust in radon risk management stakeholders.

Knowing radon stakeholders: Which stakeholders related to radon are known to Slovenians?

The study aimed to determine the level of awareness of stakeholders in radon-related issues among residents in Slovenia. The survey results showed that the Institute Jozef Stefan, National Institute of Public Health, and Ministry of Health were the most well-known stakeholders in radon-related issues among respondents. However, contractors for remediation were more well-known than companies measuring radioactivity, and Radonova Laboratories were the least known. This suggests that people may have more difficulties performing tests for radon concentrations in their homes than in mitigating their homes if concentrations exceed legal norms, because they have less knowledge of the point of contact.

Interestingly, the survey found that stakeholders working on radon-related issues are not significantly better known to residents living in high and medium risk radon areas compared to those living in low-risk areas. This indicates a need for more outreach efforts by lesser-known stakeholders to increase awareness and understanding of their roles in mitigating radon risks. Additionally, the study suggests that some stakeholders are better known than others, highlighting a potential communicators for radon risk related topics.

Selected statistical results:

- The Institute Jozef Stefan, is known by 83% of respondents, the National Institute of Public Health (81%) and the Ministry of Health (78%). The Institute for Occupational Safety and Health is known by 57% of people, while the Slovenian Radiation Protection Administration is known by 46% of people, contractors for remediation (33%), companies measuring radioactivity (15%), and Radonova Laboratories (6%).

Truthfulness of radon stakeholders: Who in Slovenia is recognized as a trustworthy source of information about radon risks?

According to the results, scientists and researchers from universities and the Institute Jozef Stefan were considered the most trustworthy stakeholders in matters related to radon, with 80% of respondents recognizing them as reliable sources of information about radon risks. The Slovenian Radiation Protection Administration was the second most trusted stakeholder, with 73% of respondents recognizing it as trustworthy (N=863). On the other hand, contractors involved in remediation, such as builders, were the least trusted, with only 41% of people having confidence in them. The Ministry of Health was also not considered very trustworthy, with only 59% of people having faith in its ability to provide accurate information about radon risks. Interestingly, although not well-known, Radonova

laboratories were recognized as rather trustworthy by 69% of those who were familiar with them in Slovenia.

After comparing the recognition of different stakeholders based on their trustworthiness in various radon areas, it was found that there were no significant differences between high and low radon areas in Slovenia. This suggests that people's perceptions of the trustworthiness of stakeholders remain consistent regardless of the radon risk level in their area.

Competence of radon stakeholders: Which stakeholders involved in radon mitigation in Slovenia are recognized as technically competent?

The survey aimed to gauge public perception of the technical competence of various stakeholders involved in managing radon risk. Respondents who knew the actors were asked to rate their level of agreement with the statement "technically competent with regard to radon mitigation" for each stakeholder on a scale of 1 to 5.

The results revealed that the Institute Jozef Stefan and the Radiation Protection Administration were the most technically competent stakeholders in radon risk mitigation, recognized by 79.8% and 79.1% of the population, respectively. Scientists from universities were also highly regarded, with 76.7% of respondents recognizing their technical competence in managing radon risks. Conversely, medical doctors and the Ministry of Health were perceived as the least technically competent stakeholders in addressing radon risks. The building industry and contractors involved in remediation were only recognized as technically competent by 52.6% of the population, despite their crucial role in managing radon risks. Radonova laboratories were recognized as a technically competent stakeholder, with 75% of those who knew them considering them competent.

There were no significant differences in the recognition of technical competence of radon-related stakeholders in high and low radon risk areas, except for Radonova laboratories, which were recognized as particularly competent in high radon risk areas. These results indicate that the public's perception of the technical competence of stakeholders in radon risk mitigation is consistent across different radon risk areas, with the exception of Radonova laboratories, which are perceived as particularly competent in areas with higher radon risk levels. Overall, these findings offer valuable insights into how the public perceives the technical competence of different stakeholders involved in managing radon risk.

Severity: What are people's beliefs regarding the seriousness of negative consequences due to radon?

The severity of radon exposure is determined by people's beliefs regarding the seriousness of its negative consequences. The goal of our study was to measure how respondents perceive the severity of radon exposure for themselves and for others.

Our findings suggest that respondents view radon as a significant risk, with high levels of agreement that not taking action when there is a high radon concentration in their homes would pose a severe threat to their health. Interestingly, we found no significant differences in perceived severity between people living in different radon risk areas.

One particularly noteworthy result is related to the video. Participants who were exposed to the video, so the respondents with low or no knowledge of radon issues, had a significantly lower perception of

severity compared to those who didn't see the video, who had a higher level of knowledge about radon issues.

We also found a significant positive correlation between the Severity scale factor scores and the Intention to Behavior Change factor scores. This means that respondents who perceived higher severity of negative consequences associated with radon exposure were more likely to report a stronger intention to test and mitigate radon levels. Specifically, the Pearson correlation coefficient was r = .295, indicating a moderately strong correlation, with a p-value of less than .001, which is highly statistically significant.

Susceptibility: Do people in Slovenia belive that radon increases the likelihood of health consequences?

Perceived susceptibility is an individual's belief about the likelihood of acquiring a disease or experiencing negative health consequences as a result of taking or not taking action to remediate a potential hazard. In the context of radon exposure, perceived susceptibility can be divided into susceptibility for yourself and susceptibility for others. A study revealed that more than half of respondents believed they could develop lung cancer due to radon if they did not address high concentrations in their homes. A majority of respondents also believed that their neighbors would fall ill if they did not remediate high radon concentrations in their homes. Interestingly, 51% of respondents found it unlikely that they would become ill if they did not remediate high radon concentrations.

The level of susceptibility related to radon exposure is not different in different radon risk areas. Hovewer, exposure to radon-related information in the form of a video or having low knowledge about radon may lead to a lower perception of susceptibility to radon exposure. More research is needed to investigate the relationship between communication intervention, level of knowledge and susceptibility.

Response efficacy: Do individuals believe dwelling remediation is effective in reducing radon concentration?

An individual is more likely to intend to perform a behavior, such as testing or mitigating for radon, only if they are convinced that it will lead to the desired outcome. Coping appraisal plays a crucial role in adopting or maintaining a health protection behavior and helps overcome fears and mental blocks. Coping appraisal comprises three elements: response efficacy, response costs, and self-efficacy. While most respondents agreed or strongly agreed that home remediation and special installations offer effective protection against radon hazards, some respondents expressed disagreement and uncertainty regarding the ability of special installations to reduce radon levels to a safe level. A test conducted to compare response efficacy scores between participants who watched a video and those who did not watch a video did not show any significant statistical differences. This suggests that exposure to a video, may not have a significant impact on an individual's perception of the effectiveness of recommended behviours. Another test was conducted to compare response efficacy scores between participants from high and medium risk areas and those from low radon risk areas, and the results were not statistically significant. Finally, a correlation analysis was conducted to examine the relationship between response efficacy scores and participants' intention to test and mitigate radon exposure, and the results showed a positive but relatively weak relationship. Participants who perceived the recommended behviours as more effective were more likely to express the intention to test and mitigate radon exposure. These findings highlight the importance of promoting accurate and effective information about radon exposure and mitigation, to improve individuals' perception of the effectiveness of recommended behviours and

increase their intention to take action to protect themselves and others from the harmful effects of radon exposure.

Self-efficacy: Do residents in Slovenia have confidence in their own ability to conduct radon testing and mitigation effectively?

Self-efficacy refers to the belief in one's own competence to perform a behaviour even in the face of barriers or in other words, the individual in carrying out the recommended coping response. The results indicate that over 75% of individuals lack confidence in their ability to effectively remediate their homes if they wished to do so. However, more than 63% express confidence in their capacity to hire a contractor to reduce indoor radon levels if they desired. Additionally, over 30% of respondents lack confidence in their ability to find the necessary information to protect themselves in the event of high radon levels in their homes. Around 33% remain neutral on the matter, while nearly 35% feel confident in their ability to access the required information to safeguard themselves against radon exposure. There is no notable variance in self-efficacy levels between individuals residing in high radon risk zones and those in low radon risk areas.

Perceived behavioural control - financial and other burdon and ease: Is radon testing and mitigation perceived as a financial or other burden?

Perceived behavioral control encompasses the evaluation of financial resources and the ease associated with radon testing and remediation, as well as the burden these measures impose on individuals. These factors are crucial in determining a person's self-efficacy. It is important to note that perceived behavioral control, burden, and ease are measured separately and do not represent a single underlying construct.

The findings reveal that approximately 48% of respondents feel confident in their ability to afford a radon test costing 50 euros, while 36.6% remain neutral, and 15.4% stated that they cannot afford it. Similarly, over 48% of people in Slovenia indicated their capacity to afford 1000 euros for radon remediation, with 22% expressing neutrality and 14.6% unable to cover the cost.

In terms of financial burden, 48.8% of respondents agree or strongly agree that reducing radon in their homes would require more resources than they possess, while 35.5% disagree or strongly disagree with this statement. Overall, 65.6% of respondents believe that remediating their dwellings to reduce radon would be burdensome. Additionally, a significant majority (72.9%) perceive the procedure for remediating their homes due to radon as difficult. However, 58.6% believe that testing their dwellings for radon is relatively easy. The findings indicate that individuals who lack confidence in their ability to procure 50 euros for radon testing tend to exhibit minimal or low intentions to take protective measures against radon exposure

No statistical differences were observed in terms of perceived behavioral control, burden, and ease between areas with high radon risk and areas with low radon risk.

Esthetic impact of remediation works on a dwelling: Do residents believe that radon mitigation would visually harm their homes?

The analysis shows that a majority of people leaving in Slovenia do not believe that mitigation or a dwelling due to radon would visually harm their home, with a smaller percentage perceiving a significant visual impact. A significant portion of respondents expressed uncertainty or ambivalence about the aesthetic consequences of radon mitigation.

Economic impact of radon on a property value: Does a radon problem in a building negatively impact its financial value?

The study assessed the economic impact of radon on property value using a single-item measurement. Results from N=1829 valid responses revealed that, the majority of respondents (64.7%) agreed or strongly agreed that radon problems can indeed influence the value of a property, indicating their recognition of the potential economic impact associated with radon issues. Approximately 24.2% of respondents neither agreed nor disagreed, suggesting some level of uncertainty or lack of opinion on the matter. Conversely, 11% of respondents disagreed or strongly disagreed with the statement, indicating a perception that radon problems have minimal influence on property value.

These findings provide valuable insights into participants' perspectives on the economic implications of radon on property value. They highlight that a significant portion of respondents acknowledge the potential impact, while a smaller proportion expresses skepticism or lack of concern regarding this matter.

Subjective norms: Do family members and friends of resopondents care about radon-related issues?

Subjective norms refer to the belief that an important person or group of people will approve and support a particular behaviour, for instance protection against radon (test and/or mitigate). The results of the subjective norms assessment provide valuable insights into participants' perceptions of the support and approval they receive from important individuals regarding radon-related behaviors. The findings indicate that there is a diversity of perspectives among participants.

Regarding radon testing, nearly half of the participants (47.7%) perceive that the important people in their lives are either neutral or unsupportive of them testing for indoor radon. However, an equal percentage (47.7%) believes that the important individuals in their lives are in favor of radon testing.

In terms of radon remediation, a significant proportion of participants (49.4%) believe that the important people in their lives are not supportive of remediating their homes for radon if necessary. On the other hand, 17.9% perceive support from important individuals for radon remediation.

When it comes to being informed about radon, a considerable portion of participants (45.8%) believe that the important people in their lives value their knowledge and awareness about radon. However, 15.6% perceive that these important individuals may not prioritize being informed about radon.

In terms of the care shown by significant individuals in their lives regarding radon-related actions, a majority of participants (54.1%) believe that these individuals do care about their actions related to radon in their homes. Conversely, a small percentage (12%) perceive that these individuals do not place importance on their radon-related actions.

Overall, these findings highlight the varying perspectives participants have regarding the support and approval they receive from important individuals for radon-related behaviors. It emphasizes the importance of understanding the social context surrounding radon testing, radon remediation, and being informed about radon-related issues.

Descriptive norms: Is radon testing and mitigation a common practice within social groups?

Descriptive norms refer to the perception of what is considered typical or normal behavior within a group. It involves understanding what most people in a specific context think, feel, or do. In the context of radon, descriptive norms pertain to individuals' perceptions of others' behavior regarding testing for radon and mitigating their homes.

The results revealed that there is a significant belief among participants that most people in their neighborhood have tested their houses for indoor radon. However, participants expressed a prevailing perception that the people they know, including their friends, do not engage in activities related to indoor radon. Additionally, participants perceived that remediation of houses for radon, when levels exceed the limits, is not a common practice in their neighborhood. These findings provide insights into participants' perceptions of the prevalence of radon-related behaviors in their community and social networks.

Furthermore, we examined whether descriptive norms could predict the intention to safeguard against radon. The results clearly demonstrate that when individuals perceive radon testing and mitigation as customary or typical behaviors within their social group, they are more likely to engage in testing and mitigation measures.

Health effect perception: Do individuals have acquaintances who may have experienced health issues as a result of radon exposure?

"Health effect perception" refers to individuals' personal beliefs about the health consequences of radon exposure. A majority of participants (84.2%) reported not personally knowing anyone who might have experienced health issues due to radon. Nevertheless, those who do have such personal acquaintances are more likely to consider radon testing and mitigation measures.

Stigma: Is there a risk of stigma associated with radon in dwellings?

Stigma is a social phenomenon characterized by the disapproval or negative judgment associated with a particular circumstance, attribute, or individual. The study explored participants' attitudes towards the

handling of radon-related issues, with a focus on the potential stigma associated with them. Interestingly, the results indicate that a majority of participants are quite open to discussing radon matters, as 69.1% disagreed with the notion of keeping a radon problem secret, and 80.4% disagreed with the idea of being cautious about sharing radon-related information.

Information comprehensiveness: Is there enough information readily accessible?

Information comprehensiveness measures the extent to which respondents have sufficient information concerning radon and performing radon tests at home. In general, most of the respondents feel well in informed about which actios are needed related to indoor radon levels and most of them they also feel that there is enough information for them to decide whether they should perform a radon test at home.

Information uncertainty: Is there too much uncertainty to make informed decisions?

Some respondents have expressed that the information regarding the health effects of radon remains too uncertain for them to take decisive actions. The majority of respondents, however, maintain a neutral stance on the statement that 'Information about the health effects of radon is still too uncertain to act upon.'

Affective response to information: Does information related to radon elicit negative emotions?

In the field of communication science, the term "affective response to information" refers to the emotional or feeling-based reactions and attitudes that individuals experience when they receive and process information through various communication channels. This concept acknowledges that communication is not solely about the transmission of facts and data but also involves the elicitation of emotional reactions in the audience.

The findings indicate that information pertaining to radon does not elicit strong emotional responses among the respondents. The majority of individuals tend to remain neutral when it comes to feelings of concern or nervousness regarding the potential impact of radon-related information.

Furthermore, the results demonstrate a clear relationship between emotional responses to radon-related information and the intention to take protective measures. Specifically, a stronger emotional reaction to information about radon corresponds to a higher likelihood that respondents express the intention to conduct radon testing or engage in mitigation efforts.

Preference for post-survey radon related information: Which communication channels are recommended for radon-related communication?

As anticipated, the majority of respondents have shown limited interest in seeking further information concerning radon. However, among those who express a willingness to receive additional radon-related information, the preferred communication channels are television, radio, and newspapers, followed by printed leaflets and personalized information letters. Approximately 16% of the respondents have indicated a preference for obtaining information through school resources or social media as alternative communication channels.

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1. Introduction

This report presents the findings of the Slovenian survey, which is a component of a broader study examining societal attitudes and behaviours towards radon in 15 European Member States. These results offer important insights into the Slovenian public's understanding, attitudes, and behaviour regarding radon. Furthermore, they will contribute to the RadoNorm European Radon Behaviour Atlas, which aims to comprehensively map all relevant factors that influence the successful implementation of National Radon Action Plans across Europe. As radiation protection and radon action plans involve both technical and socio-technical components, this Atlas is an essential tool for effective policy development and implementation of interventions in particular communication strategies.

The objectives of this study are as follows:

i) To gauge socio-psychological factors that could influence people's behavior regarding protection from radiological risks associated with radon, using a survey;

ii) To examine which of these factors are associated with actions such as radon testing and mitigation;

iii) To offer empirical evidence that can guide awareness and communication strategy aimed at increasing the number of radon tests and mitigations.

iv.) Additionally, the study explores potential disparities in radon awareness, attitudes, and behaviors between regions in Slovenia categorized as high and moderate radon risk areas and those identified as low radon risk areas.

In particular, the following 27 socio-psychological aspects, grounded in different health protection and risk communication theories, were investigated:

Radon protection behaviour, Intention to protect from radon, Radon awareness, Salience, General radiation knowledge, Radon knowledge, Risk perception, Confidence in authorities for risk management, Knowing radon stakeholders, Truthfulness of radon stakeholders, Competence of radon stakeholders, Severity, Susceptibility, Response efficacy: remediation, Self-efficacy, Perceived behavioural control: financial and other burdon and ease, Esthetic impact of remediation works on a dwelling, Economic impact of radon on a property value, Subjective norms, Descriptive norms, Health effect perception, Stigma, Information processing, Information comprehensiveness, Information uncertainty, Affective response to information, and Preference for post-survey radon related information.

This study was conducted in a comprehensive and holistic manner, through an inter-organizational cooperation involving a multidisciplinary team, with support from both the Slovenian Radiation Protection Authorities and the H2020 research and innovation RadoNorm project. The team consisted of experts from diverse fields, including risk perception and risk communication scientists, methodologists, public opinion experts, social psychologists, sociologists, political scientists, radon mitigation experts, policy makers, and physicists. The inclusion of experts from these varied disciplines enabled a comprehensive and nuanced understanding of the societal attitudes and behaviours towards radon, and informed the development of effective policies and strategies to address radon risks.

To ensure high ethical standards for this sensitive topic, which impacts people's health, quality of life, and potentially decreases the economic value of their properties, the study was overseen by an independent RadoNorm ethical committee. This committee ensured that the study was conducted ethically, and took into account the potential consequences of the study's findings, including the possibility of stigma for affected individuals.

2. Contextual information about radon management in Slovenia

Due to its geology, many municipalities in Slovenia are heavily affected by radon, and it is estimated that approximately 60-100 people die each year due to lung cancer caused by radon exposure[2], [3]. To prevent radon-related deaths, the Slovenian Radiation Protection Administration established the Radon Action Plan in consultation with relevant ministries, technical support organizations, and educational groups. Slovenian Radiation Protection Administration is responsabile owner and implementer of RAP in RS[4].

http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED7606. In order to reduce the risk of radon exposure and subsequent cases of lung cancer in the population, authorities are seeking to increase radon testing and remediation efforts in homes where levels exceed safe limits, among other measures. The implementation of the national Radon Action Plan (RAP) aligns with the European Safety Standard directive, which requires RAPs to include initiatives such as radon mapping, promotion of construction techniques that resist radon infiltration in new buildings, and dissemination of information to the public on radon risks and mitigation strategies among others.

There are three providers of radon tests in Slovenia: Radonova (for dwellings), Institute Jozef Stefan, and the Institute for Safety at Work (for complex tests, including schools and also for dwellings). Residents in radon risk areas have access to free tests for their dwellings, although the number of tests is limited. The first radon test is conducted during the heating season, for a period of 30 to 90 days. If the results of radon tests are lower than the reference level of 300 Bq/m3, further tests are not required until changes affecting radon concentration occur, such as rebuilding a house or implementing energy efficiency measures like new windows or insulation. If the radon concentration exceeds 300 Bq/m^3, a second test is taken during the summer period.

If more than 30% of tests in an area exceed 300 Bq/m^3, the area becomes a "priority area". A list of radon priority areas in Slovenia is provided in the National Radon Action Plan (2020) and includes the following communities: Bloke, Cerknica, Črnomelj, Divača, Dobrepolje, Dolenjske Toplice, Hrpelje-Kozina, Idrija, Ig, Ivančna Gorica, Kočevje, Komen, Logatec, Loška dolina, Loški Potok, Miren-Kostanjevica, Pivka, Postojna, Ribnica, Semič, Sežana, Sodražica, Vrhnika, and Žužemberk. In this report, we refer to these areas as "**high radon risk areas**". The Radon Action Plan also identifies other municipalities that can be considered "candidates" for becoming a priority area. In this report, we refer to these areas as "**medium radon risk areas**". Additional measurements are also performed in other areas of municipalities, which we refer to as "**low radon risk areas**".

In cases where the radon concentration in a dwelling exceeds 300 Bq/m^3, remediation is advised, such as construction interventions including sub-slab depressurization, additional sealing of cracks, and implementation of insulation under the floor. A post-construction test is required to check the effectiveness of the measures taken. The average cost of remediation for a standard dwelling in Slovenia is a few thousand euros, but it is expected to be less than €10,000[5].

Communication interventions targeting employers, employees, local decision-makers, and the public in general focus on increasing awareness of radon risks and are developed in the form of folders, publications, seminars, expert meetings, workshops, and special publications for children.

This RadoNorm study represents the first comprehensive analysis of societal attitudes and behaviours towards radon in Slovenia. Through a thorough examination of public attitudes, awareness and perception of radon, the study sheds light on the current state of knowledge, beliefs, and behaviours related to this important public health concern. The research conducted within this study provides a comprehensive understanding of the societal aspects of radon, including its prevalence, radon risk perception, and the effectiveness of existing communication strategies. Overall, the results of this study

[2] Birk , M., Žagar, T., Tomšič, S., Lokar, K., Mihor, A., Bric, N., Mlakar, M., & Zadnik, V. (2022). Impact of radon on lung cancer incidence in Slovenia. *Onkologija : A Medical-Scientific Journal*, *26*(2), 16–21. https://doi.org/10.25670/oi2022-008on

[3] Response to a parliamentary question by D.Sisko, 2020, https://www.zurnal24.si/zdravje/za-pljucnim-rakom-v-sloveniji-letno-umre-1200-ljudi-348490

[4] http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED7606 (accessed on 1.05.2023à

[5] Perko T., Martell M., Rovenska K., Fojtikova I., Paridaens J., Geysmans R. (2023): D5.3, Final report from the EU-RAP study: SCK CEN, MERIENCE & SURO for EC DG Energy; EU-RAP project, Ref. Ares (2020)2496502

serve as an important baseline for future studies, as well as for policymakers and public health officials looking to develop effective strategies to address radon exposure in Slovenia.

3. Methodology

The study utilized Computer-Assisted Web Interviewing (CAWI) to survey a sample of the Slovenian population. The panel consisted of 25,000 potential respondents included in the panel of the marketing company MEDIANA, from which respondents for this study were randomly selected. The final sample included 2,012 respondents, representative of the (18+) Slovenian population in terms of gender, age, and region, with stratification based on the total number of inhabitants in Slovenia. The response rate was 27.6%. Of the respondents, 77.5% lived in low radon risk areas, 14.2% lived in medium risk areas, and 8.4% lived in high risk areas. The interviews had an average duration of 19 minutes and were conducted between November 29th and December 8th, 2022. The questionnaire included a short video providing basic and neutral information about radon and the mitigation of high radon levels in a dwelling. By showing the video selectively, we aimed to provide relevant information to those who needed it most in order to respond heuristically to questions related to attitudes, feelings, and opinions.To ensure high quality, a pilot study with a sample size of 300 was conducted before the field work, followed by a soft launch with a sample size of 264. The University of Antwerp, Belgium granted ethical approval for the study, and the RadoNorm ethical committee provided ethical oversight.

3.1 Questionnaire

The questionnaire used in this study is an improved verson of the questionnaire used in the RadoNorm Pilot study conducted in Belgium (Perko et al., 2021[6]). It was informed by a systematic literature review of methods applied in social science studies related to radon and Naturally Occurring Radioactive Material (Tomkiv et al., 2021[7]), methodological research (Muric et al, 2022[8]) regular input from RadoNorm WP6 members, and collaboration with local authorities responsible for radon risk management. The original modular questionnaire was developed in English and then translated into Slovenian. The translated questionnaire was then back-translated into English to ensure accuracy and understanding, after selecting appropriate modules to investigate in the Slovenian context.

The sequence of the topics included in the radon questionnaire in Slovenia is: a) Socio-demographic items: postal code, year of firth, education, items related to the respondent's dwelling (5 items); b) Interpersonal reactivity index (8 items), c) risk perception (9 items), d) confidence in authorities for risk management (9 items); e) radon awareness (3 items); f) radon salience (1 item); g) general radiation knowledge (3 items); h) radon knowledge (11 items);VIDEO; i) radon protection behaviour (12 items); j) intention to protect from radon (3 items); k) knowing radon stakeholders (10 items); l)Truthfulness of radon stakeholders (10 items) , m) competences of radon stakeholders (10 items); n) Severity for self and for others (4 items); o) susceptibility for self and for others (4items); p) Response efficacy (5 items); r) self-efficacy (3 items); s) perceived behavioural control (2 items); t) perceived burden (2 items); u) perceived ease (2 items); v) esthetic impact (1 item); w) economic impact (1 item); x) subjective norms; y) descriptive norms; z) health effect perception (one item), aa) stigma (two items); ab) information processing mode (10 items); ac) information comprehensiveness (2 items); ad) information uncertainty

[6] Tanja Perko, Catrinel Turcanu, Ferdiana Hoti, Peter Thijssen, Melisa Muric (2021): RadoNorm pilot study report from public opinion survey, Belgium 2020-2021, RadoNorm, Belgium DOI:10.20348/STOREDB/1174/1251

[7] Yevgeniya Tomkiv et al. (2021): Collection of existing methods, databases, scales, protocols and other tools – state of the art. Final version as of 12.03.2021 of deliverable D6.1 of RadoNorm. https://www.radonorm.eu/wp-content/uploads/file_exchange/D6.1_Methodological-state-of-the-art_approved26052021-1.pdf (accessed on 25.03.2023)

[8] Melisa Muric, Peter Thijssen, Catrinel Turcanu, Tanja Perko, Yevgeniya Tomkiv (2023): Foxes caught in the same snare : a methodological review of social radon studies, Journal of risk research - ISSN 1366-9877-26:3 (2023) p. 273-301.

(one item); ae) affective response to information (two items); af) preference for post-survey radon information (14 items); and ag) sociodemographic items: gender, region, age (control).

The figure below visually presents the sequence of the topics included in the RadoNorm questionnaire.

3.1.1 Integrated video

The questionnaire included a short video[9]. A 2 minutes long video was shown only to respondents who had no knowledge or insufficient knowledge related to radon (answered at less than six knowledge questions out of 14 correctly). The video was accompanied by a voiceover in the national language and provided basic and neutral information about radon and the mitigation of high radon levels in a dwelling. The video explained that radon is a naturally occurring radioactive gas that can cause deadly lung cancer if present in high levels. It also highlighted that it is possible to test for radon and, if necessary, remediate the problem using a method called sub-slab depressurization. The video concluded by encouraging viewers to get their homes tested and visit a website for more information. The video has been shown to the respondents with no or low knowledge related to radon (N=868, 43.2%). By showing the video selectively, we aimed to provide relevant information to those who needed it most in order to respond heuristically to questions related to attitudes, feelings, and opinions. The video has been introduced with the following words: "*We would like to show you a short video. Please, turn on your sound and watch it.*"

The text of the video was the following (the translated text in Slovenina language can be found in Annex):

> "*Hi, and welcome to Radon 101. First, it's important to know that radon is a gas, invisible and odorless. Radon is naturally occurring. It's a radioactive gas that comes off rocks deep in the soil. See, houses are like humans; they breathe in and out. If your house is built on, or even near, an area with radon, this gas can move through the ground and seep in through tiny cracks in your basement floor. And over time, this invisible, odorless gas can cause deadly lung cancer. And while most people don't have high radon levels in their home, some do. But don't panic. You can have your house tested and find out if you have a radon problem. If you have a radon problem, an expert can help you fix it simply and easily. It's a method called sub-slab depressurization. Sounds fancy, but it's really very simple. If you have radon gas creeping through cracks in your house, experts can help by sealing up any cracks in your basement floor or sub-area, installing a pipe with a fan in your basement floor and routing it outside, and up, up, up above your roofline into the outdoor air and away from your home. Once it's in place, the radon expert will test to make sure it's working and show you how to check it too. But the first step is the most important; get your home tested. You'll breathe easier and your house will too. Just visit … to find out more*."

All respondents, including those who demonstrated high familiarity with radon issues, were then presented with information about radon testing, remediation, and preliminary protective measures. They were asked to share their opinion on this matter. All respondents recived the following introduction:

> *"Before we continue with the questionnaire we point out that a building can be tested for radon; it can be remediated if there is radon detected; or there can be preliminary protective measures installed when the building is built. We would like to ask you to share your opinion on this matter."*

[9] Winsconsin department of health services, LowRadon.org and adopted to the national context – language and additional information; https://www.youtube.com/watch?v=50fX56kZiww&feature=youtu.be; accessed in 2020

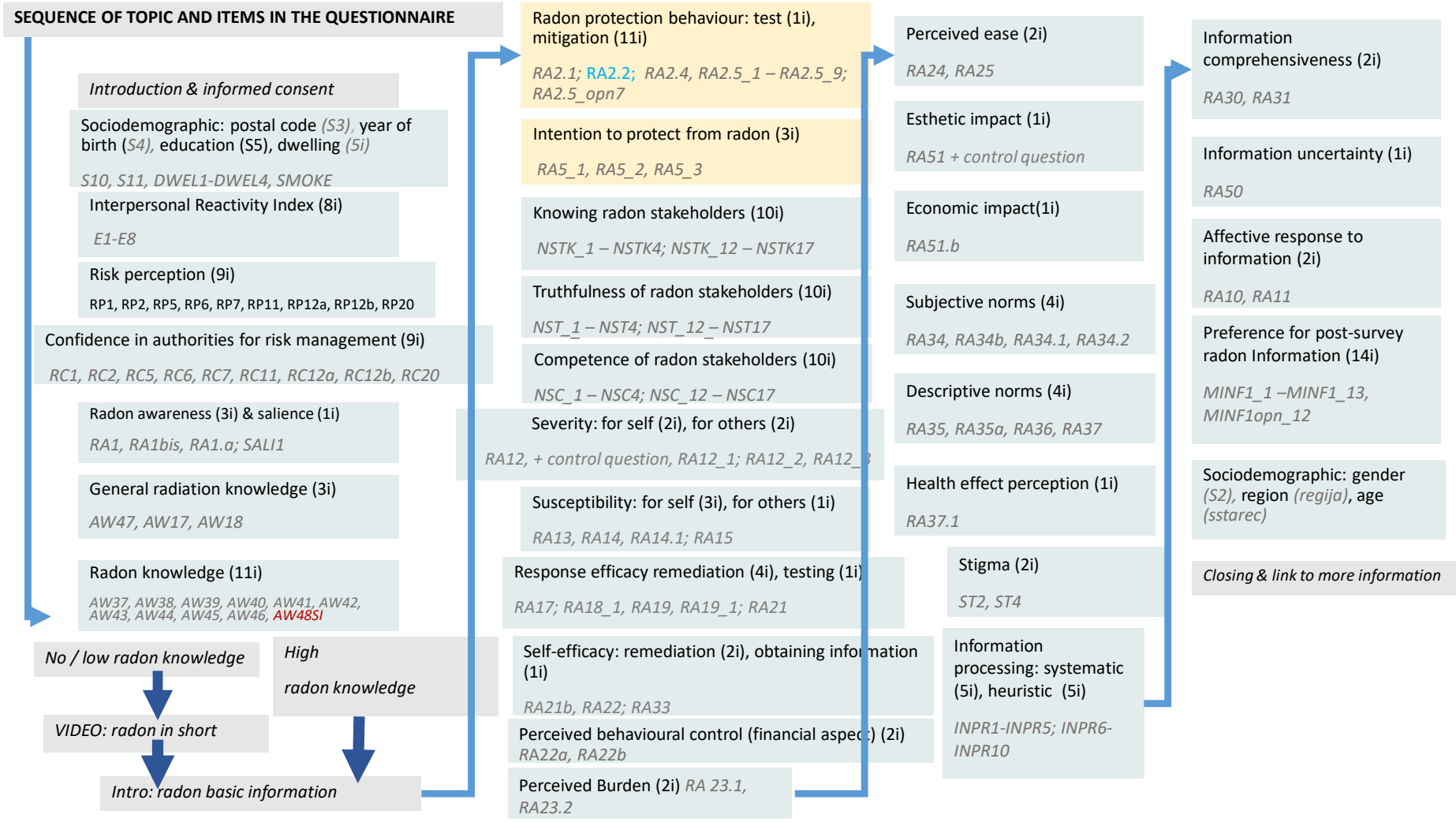


Figure 1: The Sequence of sections and items in the questionnaire applied in Slovenia (average duration 19 mins).

3.1.2 Formulation of survey items

Most items in the survey are formulated as questions or statements, with answering categories expressed by means of Likert-scales and/or adjusted to the context of the statement or question. Agreement with a statement is typically measured on a scale ranging from “strongly disagree”, through to “disagree”, “neither agree, nor disagree”, “agree”, to “strongly agree”. The answering category “Other” was included for all closed questions with predefined answering options in order to ensure completeness. The option of "no answer" or "I don't know" was also available.

The original questionnaire was developed in English. A great attention was given to the translation of the questionnaire in Slovenian language in order to assure equal meanings and understanding of statements and questions investigated. For this purpose, official translation has been done by a professional Slovenian translation company. In addition, native speakers were also asked to verify the translations. The English version of the survey, reported here, was proof-read by the RadoNorm partner EPA, Ireland and Trinity College Dublin, Ireland.

3.1.3 Selection of the opinion research company for the field work

Collection of data and field work has been funded by Slovenina Radiation Protection Administration in a context of the National Radon Action Plan. Selection of the public opinion research company to carry out the field work was done by SRPA. SRPA followed the standard procedure for tendering in Slovenian government. Institute for Market and Media Research, Mediana has been selected for the field work.

MEDIANA was founded in 1992. The company specializes in quantitative and qualitative research with a team of experts in the area of research who constantly evolve and follow the trends through market research. MEDIANA’s team of 24 employees and over 120 fieldwork partners have the experience, knowledge and motivation to perform at the highest standards, with dedication to the client and service. MEDIANA is a member of WIN (Worldwide Independent Network for Market Research) and ESOMAR (European Society for Opinion and Marketing Research). Janja Božič Marolt, President of Mediana, is the national representative for ESOMAR in Slovenia.

3.2 Respondents, panel

3.2.1 About the panel

Mediana’s panel consists of over 25.000 individuals who regularly participate in online studies (quantitative studies, online interviews, focus groups, online communities etc.). Mediana panel is probability-based panel that provides representative survey data. To ensure continuous growth of the panel, new members of the panel are recruited into the panel in several different ways: through telephone interviewing, through fieldwork face-to-face surveys on random samples and through online advertising (news sites and social media). This ensures that the members of Mediana’s panel represent Slovenian population as a whole and not only the active online population. With constant access to new panel members, Mediana ensures a representative sample for the population aged 15-80 years.

3.2.2 Information on Panel Members

Panel members update their information twice a year, most often updating their education and municipality of permanent residence. The reward system is based on panel member’s providing a unique dataset (VAT number), preventing a person to be included in the panel more than once. This means that each member of MEDIANA’s panel is verified to only have one member profile which prevents fraudulent activities.

3.2.3 Participation in Surveys

Each member of MEDIANA’s panel receives up to 3 invites per month. Mediana ensures that one panel member does not participate in similar surveys a single month (surveys, based on the same industry/same topic) which ensures independence of samples also among different topics.

3.2.4 Incentives for Panel Members

Mediana's panel members receive a variable amount of points each time they participate in the survey. Number of points is based on the length of the questionnaire and the difficulty of the topic. Each 3 months, all panel members who reach at least 100 points are invited to select a pay-out method (bank account, gift card, humanitarian donation). Each 100 points equal a pay-out of 10 EUR

3.2.5 Ethical approval

The ethical approval for this study was issued by the ethical committee of the University of Antwerp in Belgium on 16th of December, 2020 (file number: SHW_20_77). This ethical committee reviewed and approved the following documents for the pilot study: the methodology of the study; invitation letter; consent form; the full questionnaire as well as the handling and processing of the contact information of the participants. (See the RadoNorm deliverables D9.1 and D9.3 [10],[11]). The European Code of Conduct for Research Integrity[12] and Research Ethics in Ethnography/Anthropology[13] was applied to this research. The RadoNorm ethical committee advised on some specific formulation of items and cross-checked the informed consent, project information and questionnaire.

3.3 Sampling of respondents

3.3.1 Sampling of households and representativeness of respondents

A random proportional sample was prepared for the survey according to gender, age and region, representative for Slovenian population (Statistical Office of Republic of Slovenia). Random selection of appropriate respondents from the panel was performed automatically through software based on the sample framework entered into the system.

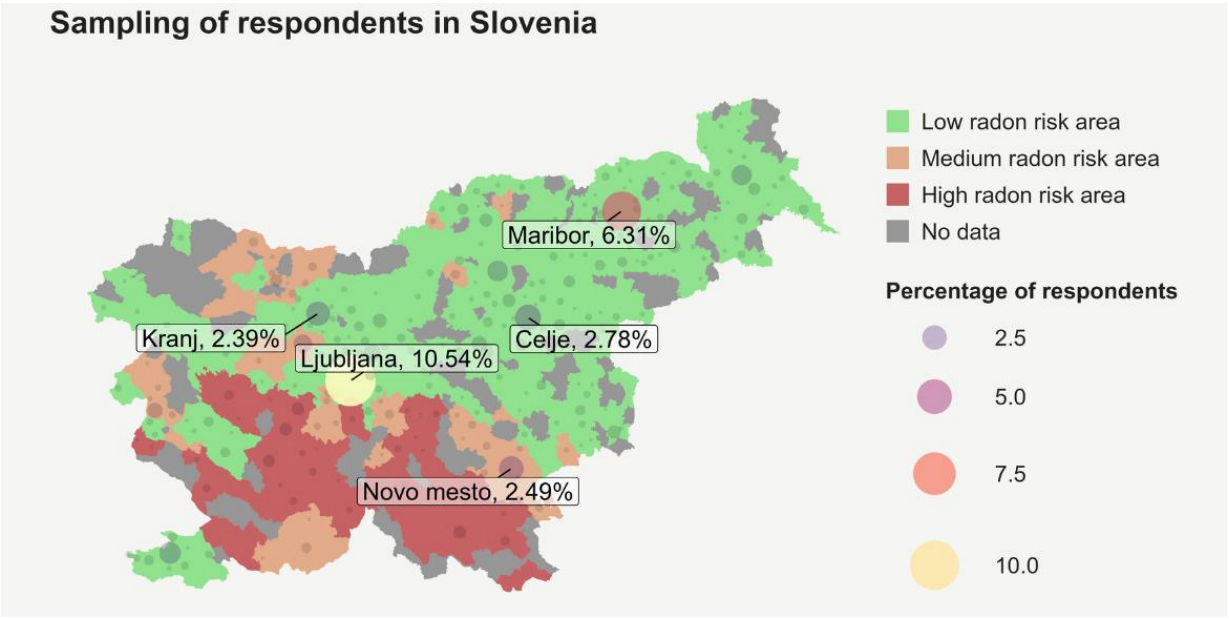


Figure 2: Sampling of respondents in Slovenia.

[10] Perko T., Geysmans R. et al (2020): Requirement No. 1 - Copies of opinions/approvals by ethics committees and/or competent authorities, D9.1, RadoNorm

[11] Perko T., Geysmans R. et al (2020): Templates of the informed consent forms and information sheets, D9.3, RadoNorm

[12] ALLEA - All European Academies, "The European code of conduct for research integrity (revised edition)," Promot. Res. Integr. a Glob. Environ., 2017.

[13] R. Iphofen, "Research ethics in ethnography/anthropology," 2011.

*Radon priority areas refer as "**high radon risk areas**", to municipalities that can be considered "candidates" for becoming a radon priority area we refer as "**medium radon risk areas**" and to the rest of territory as "**low radon risk areas**".

Table 1: Sample chareteristics.

REGION	N	% population	% sample
Pomurska	96291	5,6	5,6
Podravska	273727	15,8	15,8
Koroška	58398	3,4	3,4
Savinjska	212757	12,3	12,3
Zasavska	47203	2,7	2,7
Posavska	62398	3,6	3,6
Jugovzhodna Slovenija	118078	6,8	6,8
Osrednjeslovenska	452599	26,1	26,1
Gorenjska	170958	9,9	9,9
Primorsko-notranjska	43607	2,5	2,5
Goriška	97331	5,6	5,6
Obalno-kraška	98835	5,7	5,7
GENDER	**N**	**%**	**% sample**
male	865229	50,0	49,8
female	866953	50,0	49,9
other			0,2
N.A.			0,1
AGE	**N**	**%**	**% sample**
18-24	138959	8,0	8,0
25-34	239725	13,8	13,8
35-44	304988	17,6	17,6
45-54	302531	17,5	17,5
55-64	296455	17,1	17,1
65+	449524	26,0	26,0

**For weighting purposes, the shares of "other" and "N.A." in gender were equally subtracted among male and female to ensure proper sampling.*

- Weights for the sample: minimum weight 0,83, maximum weight 1,27

3.3.2 Timing of the field work, reminders and response rate

In order to achieve the quota, there were three series of invites in a period between 29th of November 2022 and 8th of December 2022. The response rate was 27.6%.

Table 2: Invitation to the RadoNorm survey.

	Date	N	Time
Soft launch	29.11.2022	264	14:33, in 5sec interval
1st series of invites	29.11.2022	3972	15:19, in 5sec interval
2nd series of invites	30.11.2022	1986	9:48, in 5sec interval
3rd series of invites	8.12.2022	1073	13:11, in 5sec interval
Start of interviewing	29.11.2022		14:37
End of interviewing	11.12.2022		15:29

Table 3: Contacts and response rate in RadoNorm survey.

	N	Response rate
Number of contacted panelists	7295	
Opened e-mail invite	2508	34,4%
Opened questionnaire (link click)	2458	33,7%
Incomplete surveys	436	6,0%
Removed (deleted) completed surveys	10	0,1%
Complete surveys	2012	27,6%

Table 4: Completed surveys by days.

Date	Number of completed surveys	Invites
29.11.2022	685	1st series
30.11.2022	796	2nd series
1.12.2022	115	
2.12.2022	59	
3.12.2022	21	
4.12.2022	17	
5.12.2022	19	
6.12.2022	10	
7.12.2022	15	
8.12.2022	210	3rd series
9.12.2022	47	
10.12.2022	14	
11.12.2022	4	

3.3.3 Respondents per radon risk areas

In this report, we refer to radon priority areas as "high radon risk areas", to municipalities that can be considered "candidates" for becoming a priority area we refer as "medium radon risk areas" and to the rest of territory as "low radon risk areas". Of the respondents in this survey (N=2012), 77.5% lived in low radon risk areas, 14.2% lived in medium risk areas, and 8.4% lived in high risk areas.

Table 5: information by radon risk area.

	Overall (N=2012)
Radon risk area	
Low radon risk area	1559 (77.5%)
Medium radon risk area	285 (14.2%)
High radon risk area	168 (8.4%)

3.3.4 Socio-demographics characteristics and type of the respondent's dwelling

Table 6:Summary of socio-demographic characteristics (N = 2012), unweighted sample.

	Overall (N=2012)
Level of education	
Incomplete primary school	1 (0.0%)
Complete primary school	35 (1.8%)
Complete 2.3-Year vocational school	171 (8.5%)
Complete 4-year secondary school	708 (35,2)
Complete 2,3-year college	281 (14%)
Complete high school, college or more	809 (40.2%)
Don't know, NA	7 (0,3%)
Is the dwelling that you spend most of your time a property of yours or your family, or does it belong to someone else?	
I am owner or co-owner	1192 (59.2%)
It is the property of another family member	524 (26.0%)
It is the property of someone else	287 (14.3%)
Missing	9 (0.4%)
For how long have you been living in this dwelling?	
Less than 1 year	124 (6.2%)
More than one year	1888 (93.8%)
In approximately which year was the dwelling you live in built?	
Mean (SD)	1970 (24.0)
Median [Min, Max]	1972[2.00, 114]
Missing	142 (7.1%)
Was the dwelling renovated for energy-saving purposes (e.g. insulation, windows, …)?	
Yes	1230 (61.1%)
No	472 (23.5%)
Missing	310 (15.4%)
In what type of dwelling do you live?	
Studio/Apartment	479 (23.8%)
Detached House	993 (49.4%)
Semi-detached House	411 (20.4%)
Terraced House	95 (4.7%)
Other	34 (1.7%)
Is the ground floor or basement in your dwelling used as a living space?	
Yes	718 (35.7%)
No	1272 (63.2%)
Do you or does someone else in your house smoke indoors?	
Yes	166 (8.3%)
No	1839 (91.4%)
Missing	7 (0.3%)

3.4 Quality control and respondents feedback

Quality control was performed on an answer level (see below) as well as an individual level (length of participation in the survey). MEDIANA removed any and all respondents that are deemed suspicious in any way from the final database. These respondents can be removed because lack of attention to the answers, lack of attention to control questions, unusually short response time or other activity by the panel member that is deemed suspicious in any way.

Quality control at the answer level was performed with control questions. These questions were included in 2 places in the questionnaire in the form of statements in scale questions (see Figure 1). The respondent had to choose a pre-defined answer (4 – I agree / 1 – Don't agree at all). If the respondent did not choose the correct answer in both control questions, they were prevented from continuing with the survey and their data was not entered in the final database (n=41 in RadoNorm survey).

This quality control was presented to all respondents. In addition, 23 respondents were excluded from the RadoNorm survey as they did not consent to the terms of participation. Additionally, 10 respondents were excluded from the RadoNorm survey after completion of interviewing because their net time for completing the survey was below considered minimal amount of time to properly read and answer all the questions of the survey.

Table 7: Summary of all non-completes.

Reasons for exclusion of respondents	N
too fast (finished questionnaire in less than 25 % of the median length)	10
did not consent to participate	23
only clicked on mail link	51
failed on both control questions	41
only clicked on welcome screen	62
did not complete the whole questionnaire	309

MEDIANA's team received two comments with feedback from respondents. One respondent complained that the questionnaire was of a commercial nature, suggesting that perhaps the client for the study was a commercial company dealing with reconstructions of buildings. The second respondent suggested that the questionnaire did not take into account whether a household could even afford a reconstruction if the building was suffering from high levels of radon. Both respondents received satisfying answers from Mediana's liaison to panel members (Panel Manager).

3.5 Analysis

There are two types of scales used in the questionnaire, the reflective and formative. Reflective and formative scales are two types of measurement scales commonly used in socio-psychological studies to measure different constructs.

Reflective scales measure constructs that are assumed to exist independently of the measures used to assess them. In other words, the items in a reflective scale are indicators of the construct being measured, and the construct is seen as the underlying cause of the observed relationships between items. An example, in the Severity scale measure items such as "Not acting when there is a high radon concentration in my house would be a severe threat to my health."; "Not undertaking any action against high radon concentration in my house would be life-threatening for me."; "If my neighbours had high radon concentrations and don't remediate their health would be in severe danger."; "If people in my community address the radon risk then they can avoid serious health issues due to radon." with the assumption that these items are indicators of the construct of severity.

On the other hand, formative scales measure constructs that are assumed to be created by the measures used to assess them. In other words, the items in a formative scale define the construct being measured, and the construct is seen as the outcome of the observed relationships between items. An example is knowledge about radon. A formative scale measure items such as correct or incorrect answers on the following statements: radon causes headaches, radon exposure is linked to lung cancer, radon is radioactive liquid, radon has a strong odour, radon is invisible, radon levels are usually higher in the attic than the basement, testing is the only way to determine if a home has an elevated radon level, radon can enter homes through cracks in walls and floors, health effects of radon do not show for years, the risks from radon exposure increase the longer you are exposed to it, … with the assumption that these items together create the construct of radon knowledge.

The key difference between reflective and formative scales is the causal direction of the relationship between the items and the construct being measured. Reflective scales assume that the construct causes the observed relationships between items, while formative scales assume that the items define the construct. It is important to choose the appropriate type of scale for the construct being measured to ensure valid and reliable measurement of the construct.

The data analysis process involved using multiple tools and techniques. Statistical analysis was performed using SPSS and R, while Excel was used for creating some graphs and conducting basic calculations. Open-ended questions were analysed using content analysis. To ensure the accuracy of the results, validity and reliability were reported for each construct separately. Moreover, to minimize the potential for error, all calculations were independently performed by two analysts, and the interpretation of results was cross-checked by team members. Finally, the results and interpretations were consented by the Slovenian National Safety Authority to ensure their accuracy and reliability.

3.6 Roles and responsibilities of authors and their contribution to the study, timing of actions

Table 8: Roles and Responsibilities of authors and their contribution to the study and timing of actions.

	Time/Date	T. Perko[14]	M. Muric[15]	P. Thijssen[16]	C. Turcanu[17]	F. van den Eynde[18]	A. Praprot[19]	A. Q. Truong[20]	D. Škrk[21]	S. Fijuljanin[22]	D. Hevey[23]	WP6 members	MEDIANA
CONCEPTION													
Conceptualisation of measurements:scales & items	**09.2020-09.2022**	X	X	X	X						X	**X**	
STUDY DESIGN													
Design of the questionnaire	09.2022	X	X	X								X	
Translation of the questionnaire	10.2022	X							X	X			
Video voice over	15.11.2022	X											
Pilot study/Soft start	28.11.2022	X	X						X	X			
Final improvements of the questionnaire	28.11.2022	X	X						X	X			
Selecting the field work company and arrangements	October, 2022								X	X			
Test of the CAPI scripting and program	24.11.2022–05.11.2022	X	X						X	X			X
DATA ACQUISITION													
Data collection	29.11.2022 – 08.12. 2022												X

[14] Dr. T. Perko is a senior researcher and project leader at SCK CEN, Belgium. She is also the RadoNorm WP6 leader. Her expertise is risk perception and risk communication.
[15] M. Muric is the RadoNorm PhD student at University Antwerp, Belgium and SCK CEN, Belgium, focusing on methodological aspects of societal studies related to radon and NORM.
[16] Prof. dr P. Thijssen works at University Antwerp, Belgium. He is an expert in public opinion research and the RadoNorm task 6.1 leader.
[17] Dr. C. Turcanu is a senior researcher and unit head at SCK CEN, Belgium. She has expertise in surveys measuring perceptions, attitudes and behaviours related to exposures to ionizing radiation.
[18] F. van den Eynde is a master student of social sciences. As an intern at UA she was employed as a coordinator of job-students.
[19] A. Praprot is master student at UA. She was employed as a job-student by UA to contribute to the statistical calculations.
[20] A. Q. Truong is a job-student of epidemlogy gy, employed by UA to contribute to the graphical presentation of the statistical results.
[21] Dr. D. Škrk is director of Director Slovenian Radiation Protection Administration.
[22] S. Fijuljanin is a radon expert at Slovenian Radiation Protection Administration.
[23] Prof. dr. D. Hevey is Professor in Clinical Health Psychology with an expertise in psychological aspects of radiation exposure situations at Trinity College Dublin, Ireland.

Data cleaning	11.12.2022-15.01.2023	X	X										X
	Time/Date	**T. Perko**	**M. Muric**	**P. Thijssen**	**C. Turcanu**	**F. van den Eynde**	**A. Praprot**	**A. Q. Truong**	**D. Škrk**	**S. Fijuljanin**	**D. Hevey**	**WP6 members**	**MEDIANA**
ANALYSIS													
Data analysis	15.01.2023 – 21.03.2023	X		X		X	X						
Graphical design of the results	01.02.2023 – 21.03.2023	X		X				X					
DATA INTERPRETATION													
Data interpretation	01.02.2023 – 21.03.2023	X											
QUALITY PROOF													
Validation of the statistical results	10.03.2023 – 25.03.2023		X	X	X					X			
Validation of the interpretations	20.03.2023 – 25.03.2023		X	X	X				X	X	X		
STUDY REPORT WRITING													
Report writing	01.03.2023 – 25.03.2023	X											
Proof-reading	25.03.2023 - 30.09.2023								X			H. M. Akosua (SCK CEN)	
TECHNICAL and OTHER SUPPORT													
Coordination of the overall study in SI	01.10.2020-13.06.2023	X							X				

4. Results

4.1 Radon protection behaviour

Radon protection behavior: main findings

It is highly recommended by Slovenian authorities that owners and residents of dwellings, especially those in high radon risk areas, test for radon levels. If the results exceed the national reference level of 300 Bq/m^3, immediate remedial action should be taken. Unfortunately, our survey results show that only 8.6% of respondents living in high radon risk areas reported testing their dwellings for potential radon concentration, compared to 2% of respondents in low radon risk areas.

Out of the 68 respondents in our sample whose dwellings were tested for radon concentrations, 22% (N=36) living in high radon risk areas reported that the radon levels in their dwelling exceeded the national reference level and further actions were required. In low radon risk areas, 23% (N=26) of respondents reported exceeded levels of radon in their dwellings. These findings emphasize the importance of testing radon concentrations, as 22% of dwellings in high radon risk areas pose a health risk. It is worth noting that our results are consistent with previous reports, as authorities have reported that up to 30% of tests conducted in radon priority areas exceed the national reference level.

When asked whether respondents or someone else had taken action to remediate their current residence for radon, only 4.6% of participants in high radon risk areas responded affirmatively, compared to 2.5% of those in low radon risk areas. Among the 62 respondents who took mitigation action to reduce high radon concentrations in their dwelling, most relied on natural ventilation methods, such as regularly opening windows to ventilate their living spaces, instead of installing sustainable technical solutions. However, some respondents did install ventilation systems, such as forced ventilation, heat recovery, or air-to-air exchange. Notably, technical solutions like installing a radon membrane were used only in a few cases.

Overall, these findings suggest that intervention campaigns may be needed to encourage more residents in high radon risk areas to take mitigation action, and that further research is needed to determine the effectiveness of different mitigation strategies. It would be worthwhile to delve deeper into how people understand "natural ventilation" and whether their perception of it provides sufficient protection against radon in a home.

The Slovenian Radon Action Plan seeks to safeguard individuals from the health hazards posed by radon exposure in various settings such as dwellings, public places, and workplaces. Owners and/or residents of dwellings are recommended to conduct radon level testing, and if the results exceed the national reference level of 300 Bq/m3, they are advised to take remedial action. A measurement letter/report, which contains recommendations for further actions to be taken by the dwelling owner, is sent by post. Testing and remediation are considered radon protection behviours. To evaluate radon protection behviours among the Slovenian population, survey respondents were asked whether they or someone else had tested their current residence for radon, and if so, whether the results indicated a need for further action. If respondents answered in the affirmative, they were asked whether they or someone else had taken any measures to remediate their current residence, and provided with a list of potential remediation measures, including natural ventilation, ventilation systems, air suction installations, sealing of cracks in walls, anti-radon membranes, fixing of foundation cracks, and others. For the "other" category, respondents were asked to provide a brief description of the measures taken to protect their dwelling from radon.

The figures below present results related to radon protection behviours from two different population groups based on their location of residence and potential radon exposure. The group of respondents indicated as "low radon risk area" resides in territories where exceeding radon concentrations in

dwellings are not likely (N=1501), while the group of respondents indicated as "high radon risk area" live in territories where radon levels in dwellings are likely to be exceeded (N=440). These latter areas include as "radon priority areas" and "potential radon priority areas" as designated by authorities. For individuals residing in high aan medium radon risk areas, it is expected that they will test their dwellings and take remedial action in case of elevated radon concentrations. Respondent with “I don’t know” answers were excluded (N=71).

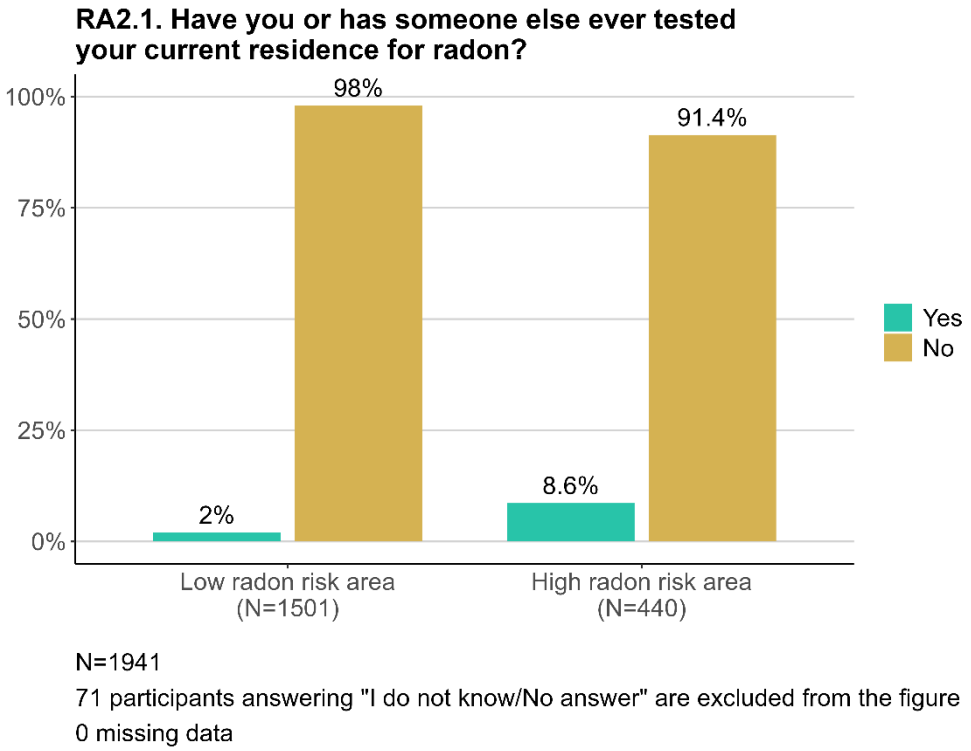


Figure 3: Testing current residence for radon. (N = 1941), unweigted sample

The results indicate that 8.6% of respondents living in high radon risk areas reported that their dwelling had been tested for potential radon concentration, compared to 2% of respondents in low radon risk areas.

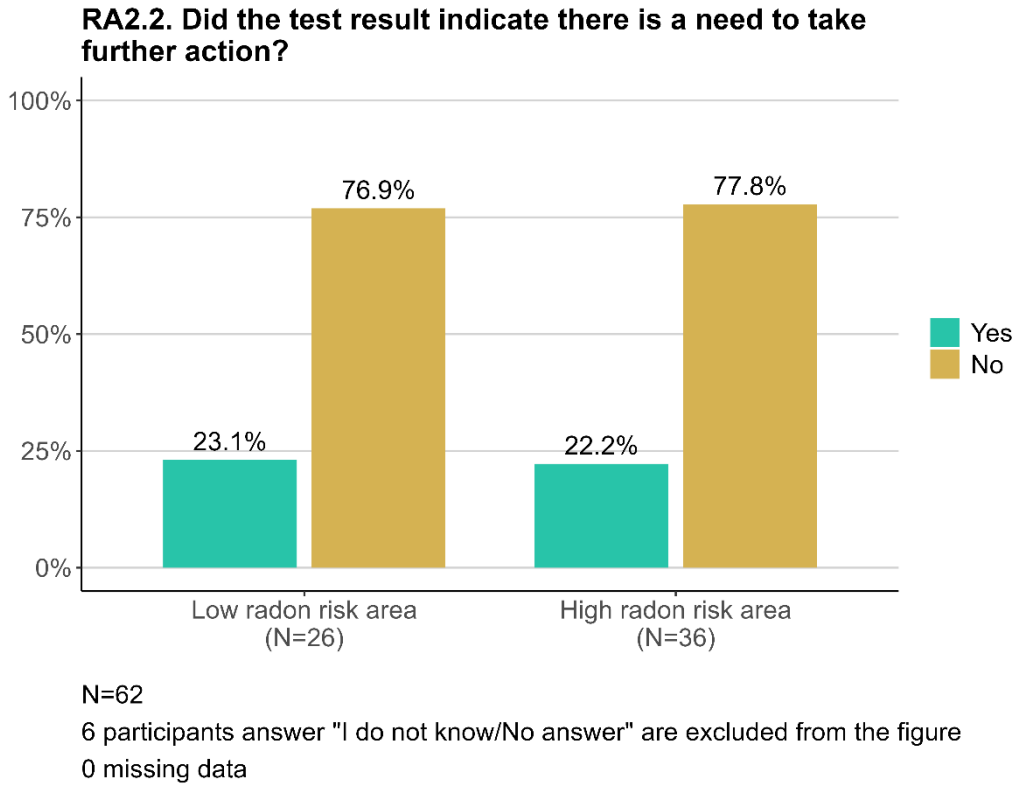
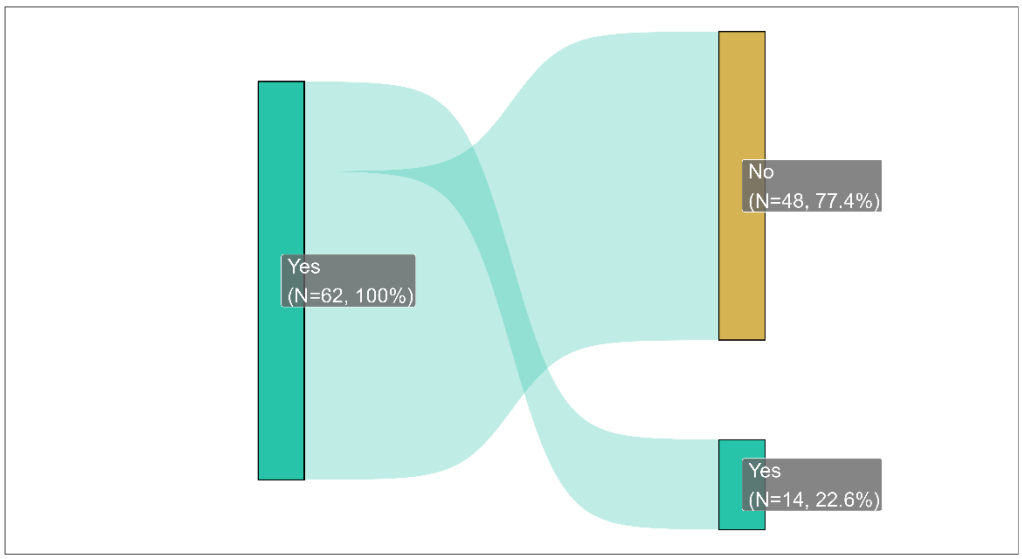


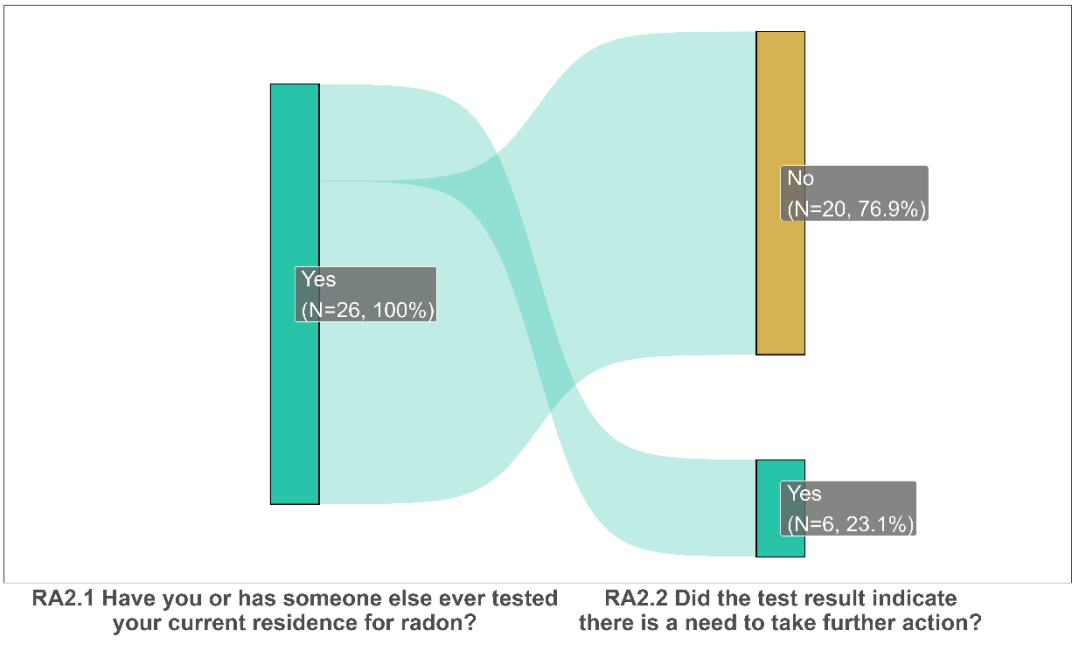
Figure 4: Test results indicating further action. (N =62), selection for respondents answering 1 on RA2.1, unweighted sample.

Out of the 68 respondents in our sample whose dwellings were tested for radon concentrations, 22% (N=36) living in high radon risk areas reported that the radon levels in their dwelling were exceeded and further actions were advised. In low radon risk areas, 23% (N=26) of respondents reported exceeded levels of radon in their dwellings. These findings highlight the importance of testing radon concentrations, as 22% of dwellings in all radon risk areas were found to pose a health risk. It is worth noting that our results are consistent with expectations, as authorities have reported that up to 30% of tests conducted in radon priority areas exceed the national reference level. Our survey also shows that an almost equal percentage in low risk areas indicated need for further action.



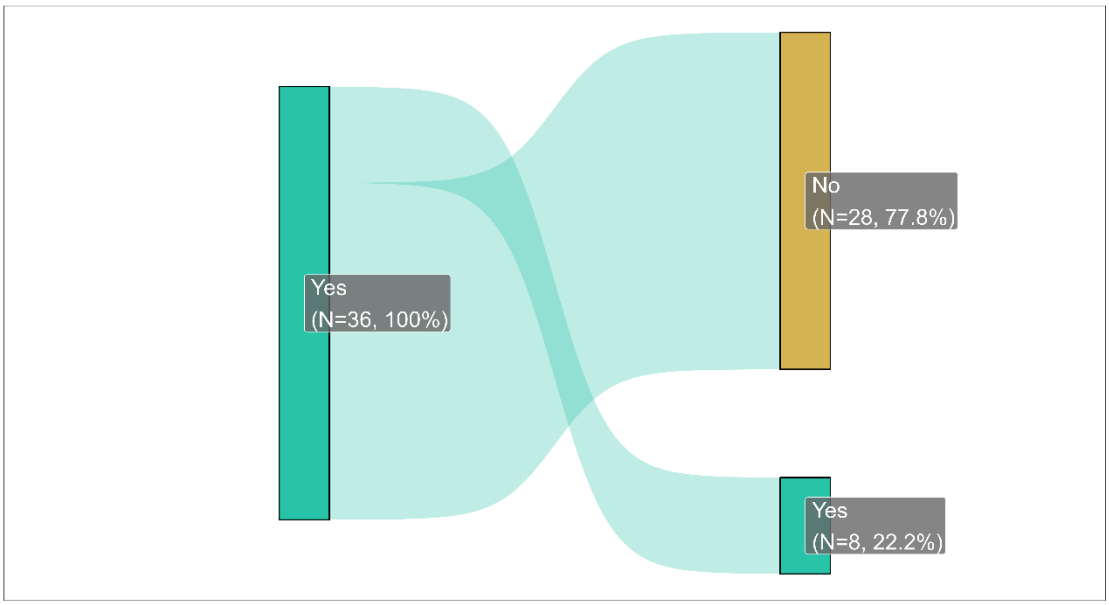
N=62
1873 'No' values in RA2.1
71 mising values in RA2.1
1950 mising values in RA2.2

Figure 5: Testing of a dwelling and a result of the test (for all Slovenian territory)



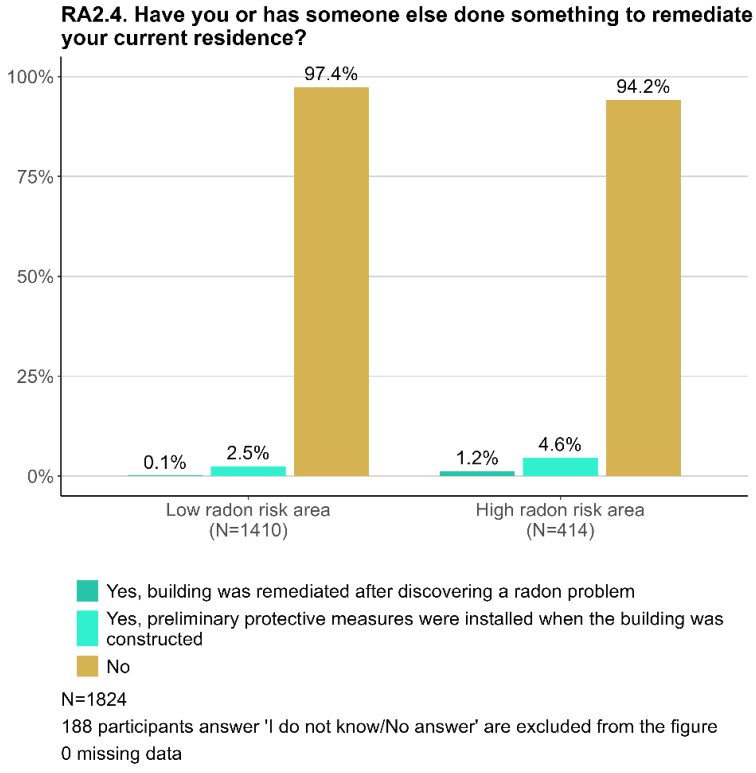
N=26 (Low radon risk area)
1873 'No' values in RA2.1
71 mising values in RA2.1
1950 mising values in RA2.2

Figure 6: Testing of a dwelling and a result of the test in low radon risk area



N=36 (Radon risk area)
1873 'No' values in RA2.1
71 mising values in RA2.1
1950 mising values in RA2.2

Figure 7: Testing of a dwelling and a result of the test in high and medium radon risk areas.



N=1824
188 participants answer 'I do not know/No answer' are excluded from the figure
0 missing data

Figure 8: Respondents' behaviour to remediate their current residence. (N = 1824), unweighted sample.

In response to the question of whether respondents or someone else had taken action to remediate their current residence for radon, 4.6% of participants in high radon risk areas responded affirmatively, compared to 2.5% of those in low radon risk areas. Of the 62 respondents who took mitigation action to reduce high radon concentrations in their dwelling, most applied or were applying natural ventilation, such as regularly opening windows to ventilate their living spaces, instead of installing a sustainable technical solution. However, some respondents did install ventilation systems, such as forced ventilation, heat recovery, or air-to-air exchange. (Respondents could indicate multiple options.) Notably, technical solutions like installing a radon membrane are used only in a few cases.

Overall, these findings suggest that public awareness campaigns and support may be needed to encourage more residents in high radon risk areas to take mitigation action, and that further research is needed to determine the effectiveness of different mitigation strategies.

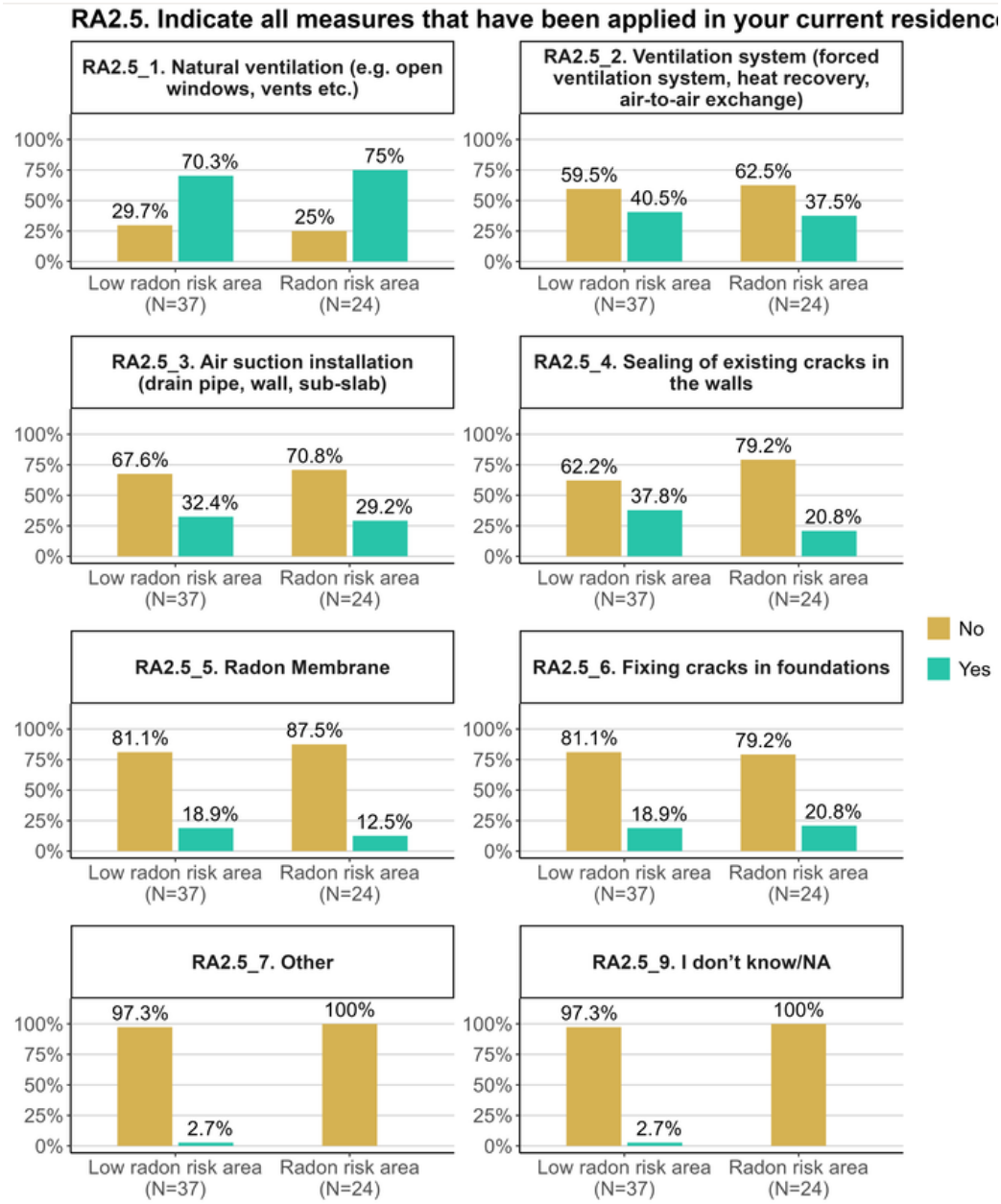


Figure 9: Test results indicating radon protection behaviou per radon risk arear. (N =62), selection for respondents answering 1 on RA2.1, unweighted sample.

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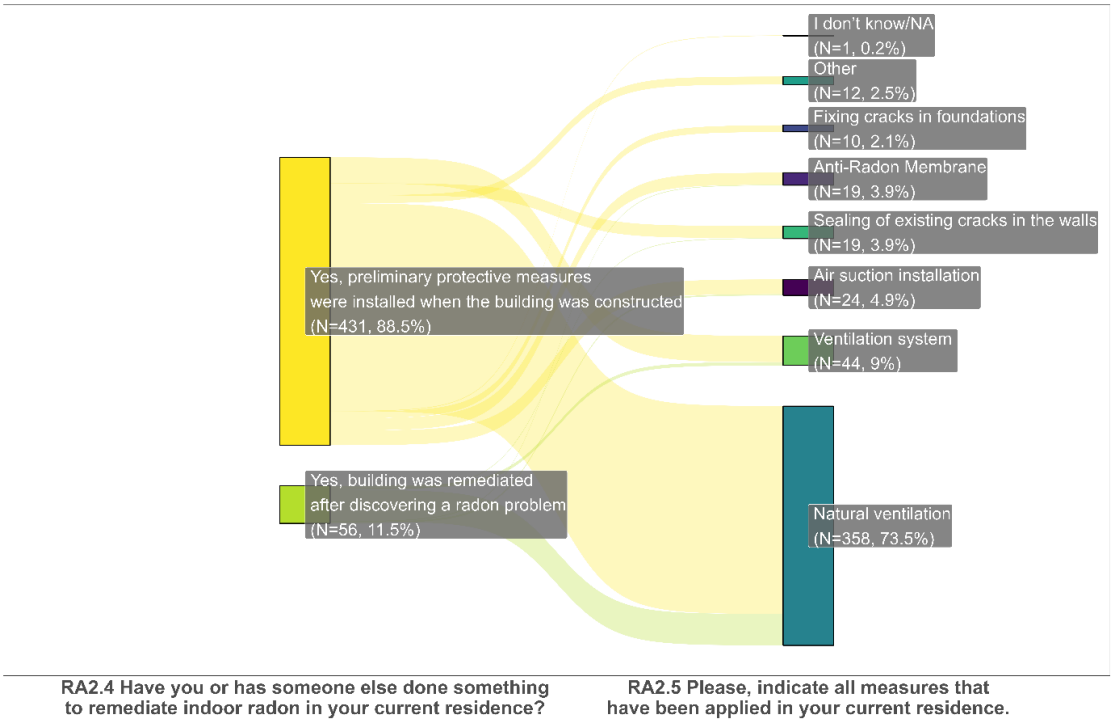


Figure 10: Protective mesures applied in a dwelling, multiple options possible (all radon risk areas).

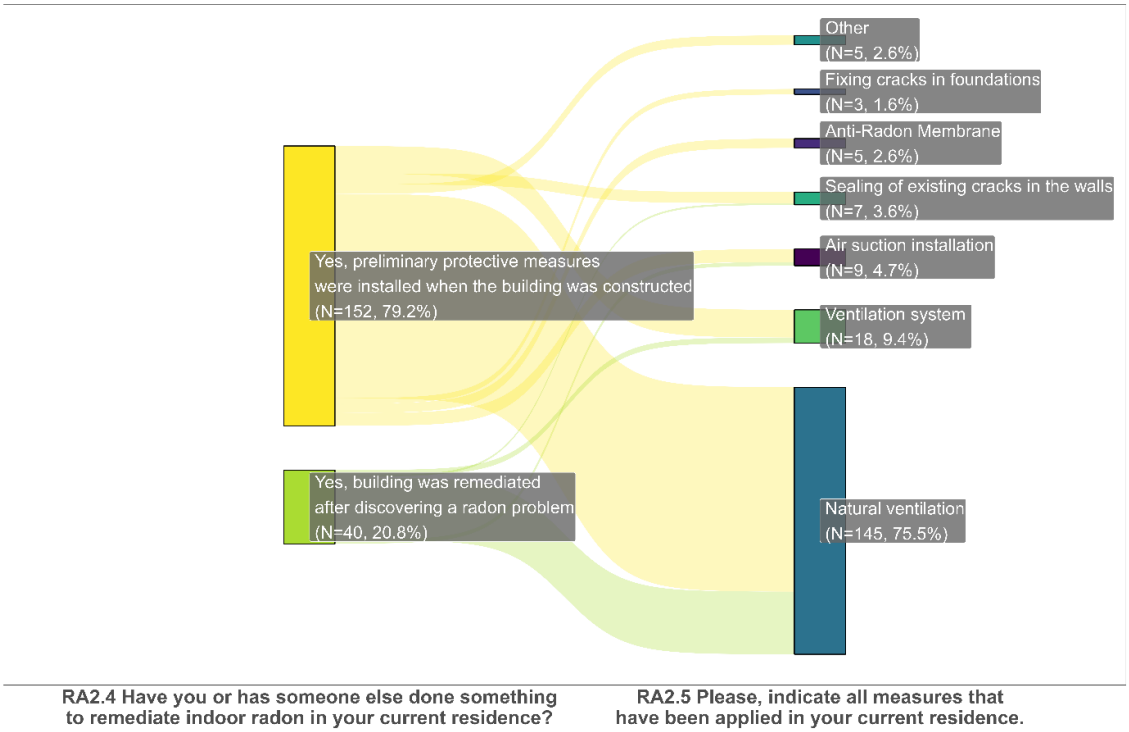


Figure 11: Protective mesures applied in a dwelling, multiple options possible (high and moderate radon risk area).

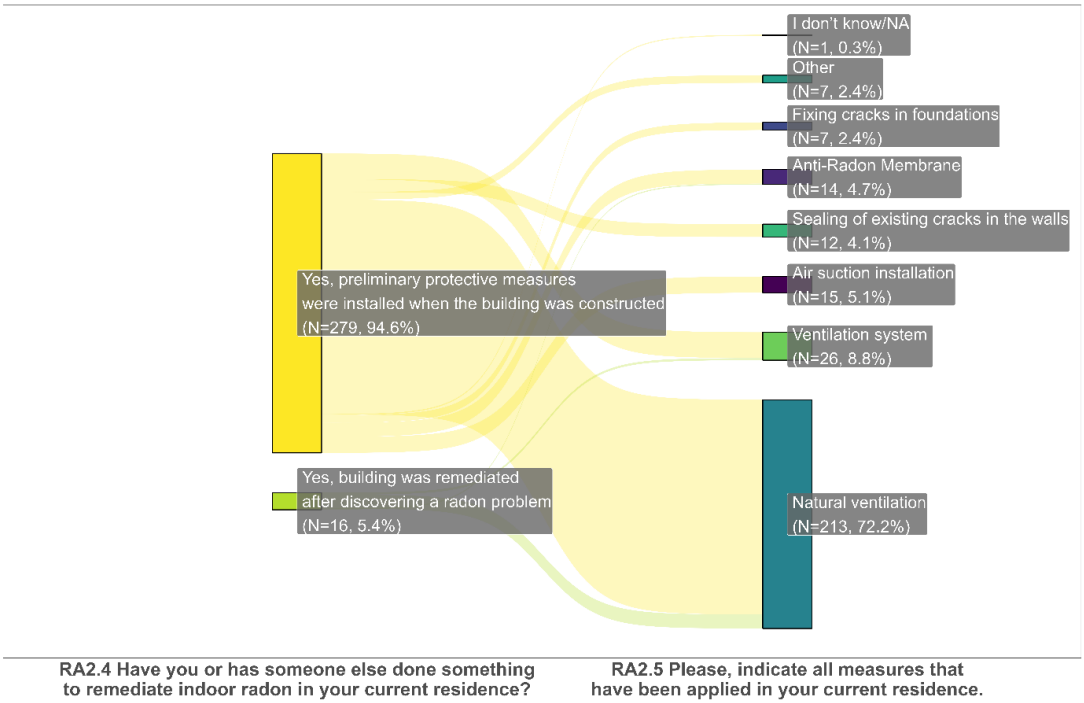


Figure 12: Protective mesures applied in a dwelling, multiple options possible (low radon risk area).

4.2 Intention to protect from radon

Intention to protect from radon: main findings

The study found that the level of compliance with the advice to test and remediate for radon is low, regardless of whether the area is high-risk or low-risk. Over 60% of respondents expressed no intention to test radon concentrations in their homes if advised. Moreover, only 30% of respondents in high-risk areas and 25% in low-risk areas intended to measure radon in their home as a precaution. These results indicate that residents exhibit a low level of proactive behavior when it comes to radon testing and mitigation. Moreover, 40% of the population may not follow advice for remediation, which suggests that increasing mitigation rates is even more challenging than increasing radon testing rates. Last but not least, the aforementioned intentions to test and mitigate are probably even overestimated somewhat, because those with low initial radon knowledge, were exposed to an informational video.

- Investigating the intention to test and mitigate radon levels is important, given that only a limited number of residents actually engage in these behviours.
- Both high-risk and low-risk areas show low compliance with the advice to test and remediate for radon..
- More than 60% of respondents strongly disagree, disagree, or are neutral about the statement "I intend to test radon concentrations in my home if advised."
- Only 30% of respondents in high-risk areas and 25% in low-risk areas agree with the statement "I intend to measure radon in my home as a precaution."
- 40% of the population may not follow advice for remediation, indicating that increasing mitigation rates is even more challenging than increasing radon testing rates.
- The intention to protect from radon was assessed using a three-items, and the scale showed good reliability.

Due to previous results indicating rather low engagement of residents in testing and mitigation we focused our investigation on intentions to test and mitigate. We suggests that investigating the intention to test and mitigate radon levels is important, given that only a limited number of residents actually engage in these behviours. It is true that intention is an attitude and not a behavior, but it can serve as a useful proxy for actual behavior in certain contexts. Radon-related studies often measure intention because it is a key predictor of whether individuals will test for and mitigate high radon levels in their homes. However, it's important to note that while intention can be a useful predictor of behavior, it is not always a reliable one. Some individuals may have a high intention to test and mitigate radon levels, but fail to follow through on this intention for various reasons. Others may have low intentions but end up testing and mitigating due to external factors such as government regulations or public health campaigns. Therefore, it's essential to take a comprehensive approach that includes investigating both intention and actual behavior, as well as the factors that influence both. By doing so, researchers and policymakers can gain a more nuanced understanding of why some individuals are more likely to test for and mitigate radon levels than others, and develop more effective strategies to encourage these behviours.

The **Intention to protect from radon** was assessed using a three-item questionnaire. Participants were asked to rate their level of agreement on the following three statements: “I intend to test radon concentrations in my home if advised.”; “I intend to measure radon in my home as a precaution.”; “I intend to start the remediation of my home if advised.” All items were rated on a 5-point Likert ansering scale, ranging from 1 (completely disagree) to 5 (completely agree).

The figures below show the results measuring the intention to protect against radon risks (through testing and mitigation) from two different population groups based on their location of residence and potential radon exposure. The group of respondents classified as "low radon risk area" resides in territories where exceeding radon concentrations in dwellings is unlikely (N=1559), while the group designated as "high radon risk area" lives in territories where radon levels in dwellings are likely to exceed safe levels (N=453). These areas are commonly referred to as "radon priority areas" and "potential radon priority areas" by authorities. Respondents who were unable to formulate their level of behavioural intention in response to a particular question were excluded from the graphs.

It is expected that individuals residing in high radon risk areas would have a higher intention to protect themselves against the dangers of radon exposure.

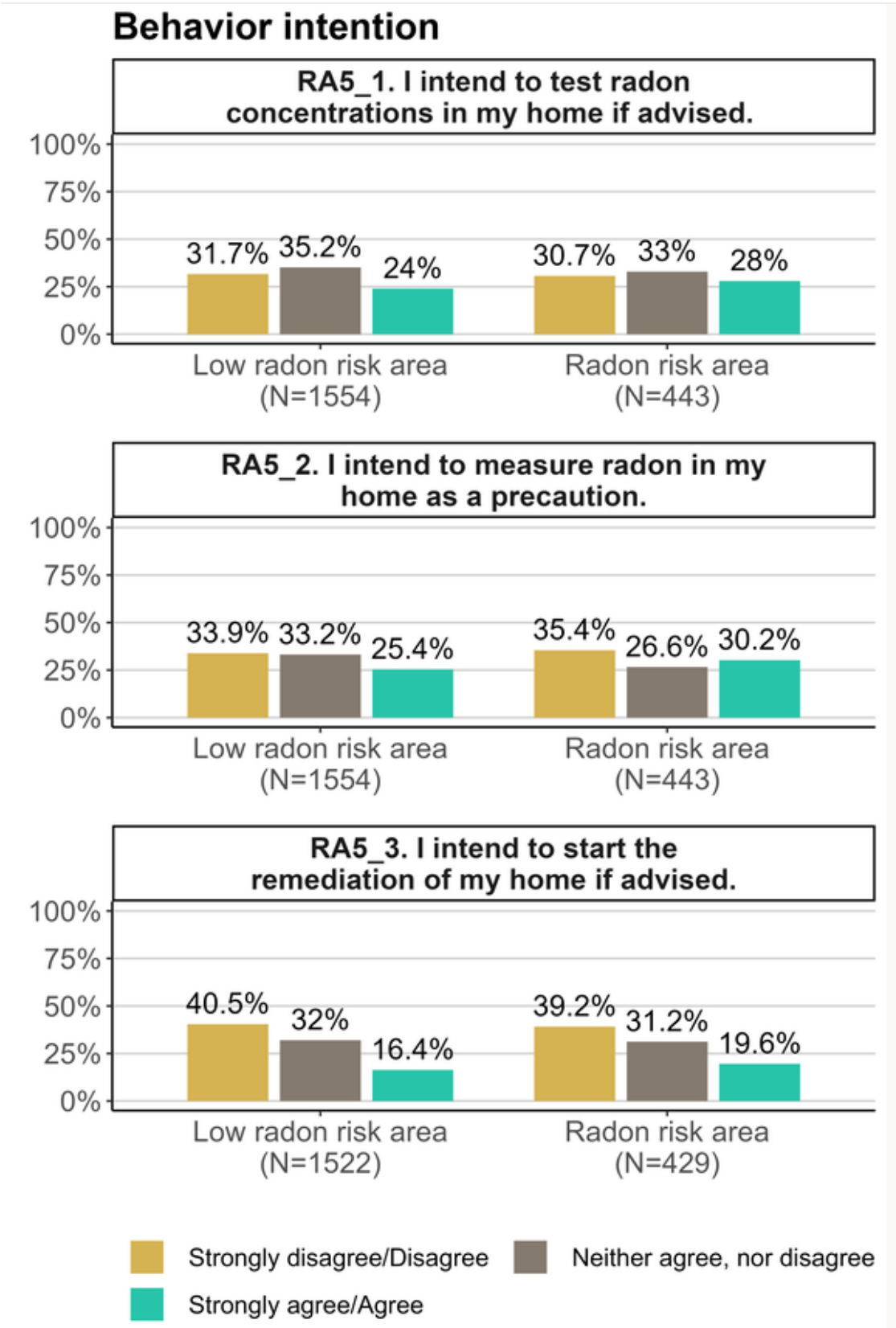


Figure 13: Overview of respondent's behavior intention per low vs. high and medium risk areas (N = 2012), unweighted sample.

The results indicate that compliance with advice to test and remediate for radon is low, both in high-risk and low-risk areas. More than 60% of respondents strongly disagree, disagree, or are neutral about the statement "I intend to test radon concentrations in my home if advised." Similarly, only 30% of respondents in high-risk areas and 25% in low-risk areas agree with the statement "I intend to measure radon in my home as a precaution." These findings suggest that residents exhibit a low level of proactive behavior. Furthermore, 40% of the population may not follow advice for remediation, indicating that increasing mitigation rates is even more challenging than increasing radon testing rates.

Table 9: Minimum, maximum, means and standard deviation values concerning respondents' intention to protect from radon. (N = 2012), unweighted sample.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA5_1 I intend to test radon concentrations in my home if advised.	1818	1	5	2.85	1.05
RA5_2 I intend to measure radon in my home as a precaution.	1847	1	5	2.84	1.07
RA5_3 I intend to start the remediation of my home if advised.	1738	1	5	2.60	1.04

Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the Intention to protect from radon scale. The analysis revealed a single factor, which accounted for 79% of the total variance (N=1691 out of 2012). All three items loaded significantly on the factor (range of factor loadings: .823 to .936), indicating that they shared a common underlying factor. The internal consistency of the scale was found to be high, with a Cronbach's alpha coefficient of .918, indicating good reliability. The factorial validity of the Intention to protect from radon scale was further confirmed in a sample of individuals living in medium or high radon risk area (N=453). Similar to the original sample, the factor analysis with principal axis factoring showed a single factor solution, explaining also 79% of the total variance. All three items loaded significantly on the factor (range of factor loadings: .800 to .950), indicating that the factor structure was consistent across both samples. Internal consistency of the scale was also found to be high in this population, with a Cronbach's alpha coefficient of .916, indicating good reliability.

Table 10: Principal axis factoring, factor loadings for intention to protect from radon, RA5_1, RA5_2, RA5_3, Unweighted sample.

Intention to protect from radon scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA5_1 I intend to test radon concentrations in my home if advised.	.936	.950	.918 N = 1691 (84 %)	.916 N = 375 (82.8 %)
RA5_2 I intend to measure radon in my home as a precaution.	.907	.912		
RA5_3 I intend to start the remediation of my home if advised.	.823	.800		

4.3 Radon awareness

Radon Awareness: main findings

The study distinguishes between radon awareness and radon knowledge. Radon awareness is the state of being conscious of radon, while radon knowledge is the information and understanding a person has acquired about radon. The study found that the majority of respondents (74.21%) were aware of radon, but a quarter of the population (24.5%) was not awarre of it. The analysis of radon awareness by geographical position showed only minor differences between low, medium, and high radon risk areas. Medium risk areas had the highest level of awareness, while high risk areas had a lower percentage of respondents reporting knowledge of radon.

Unfortunately, the results indicate a weak relationship between awareness of radon and intention to test or mitigate, showing that only about one-third of those who reported being aware of radon would test their homes if advised, highlighting a lack of consistency between awareness and action.

Our investigation into respondents' confidence in their knowledge of radon showed that lack of knowledge was strongly correlated with lack of confidence (95% of those who reported having no knowledge were not confident). For those who had heard of radon, only 6% were highly confident in their knowledge, with 69% not very confident. Among those who claimed to have a lot of knowledge about radon, 39% were confident in their knowledge, while 21% lacked confidence, and 40% were moderately confident.

Results demonstrate that there is a lack of consistency between being aware of radon and following the advice to test and mitigate if advised. For example, out of the 20% of respondents who reported being aware of radon, only approximately one-third of them would test their homes if advised, while another third would definitely not test, and the remaining third were neutral. This highlights that being aware of radon does not guarantee a corresponding action to protect against it.

We highlighted that being aware of radon does not guarantee a corresponding action to protect against it. We conducted an analysis to examine the relationship between "radon awareness" and "intention to protect from radon". The results indicated that while there was a statistically significant association between the two variables, but the correlation coefficient was very weak ($r = .089$, $p < .001$, $N = 1690$). This suggests that simply being aware of radon does not necessarily lead to individuals taking steps to protect themselves from radon risks.

In this study, it is important to differentiate between radon awareness and radon knowledge.

Radon awareness refers to the state of being aware or conscious of radon. It is a subjective concept that can be influenced by a person's perceptions, emotions, and experiences. Awareness can relate to both external and internal factors, encompassing a range of phenomena, from sensory experiences to abstract concepts. For example, if someone is aware of radon or radon prevention interventions, they may be better equipped to manage their well-being.

In contrast, radon knowledge refers to the information or understanding related to radon that a person has acquired through learning, study, or experience. It can be factual, theoretical, or practical, and it can be acquired through education, training, observation, or research.

In summary, knowledge is about having information or understanding of radon, while awareness is about being conscious of radon, both internally and externally.

The study probed the public awareness of radon with the following question: "Do you know anything about radon?" The response options were "Yes," "I have heard about it," and "No." The results showed

that the majority of respondents (74.21%) were awarre of radon, either by stating that they knew about it (20.48%) or had heard something about it (53.73%). Approximately a quarter of the population (24.5%) responded that they were not aware of the radioactive gas radon.

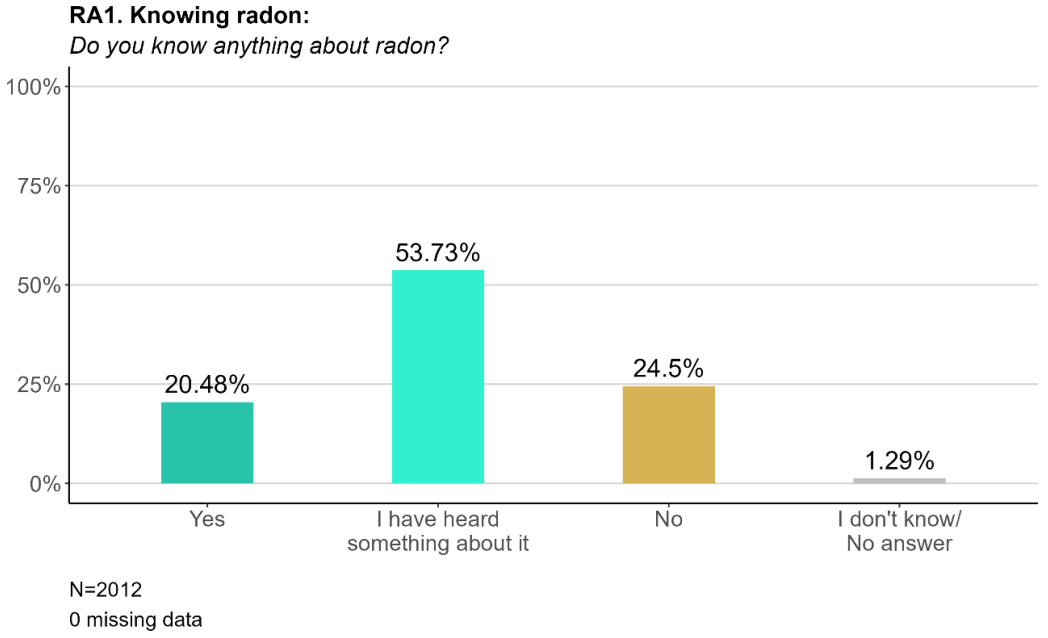


Figure 14: Respondent's awareness of radon. (N = 2012), unweighted sample.

Figure15 shows a similar analysis of the overall radon awareness split by area to identify differences in response behaviour according to geographical position. Here, the distinction is made between three areas: low, medium, and high radon risk. However, only minor differences can be observed between the areas. Overall, the respondents from low radon risk areas are somewhat more likely to be unaware of radon (25.5%) compared to the medium (17.9%) and high (23.2%) risk zones. Moreover, respondents from medium risk areas indicated the highest level of awareness regarding radon, with 27,4% indicating "Yes" and 54.8% stating that they had heard something about it.

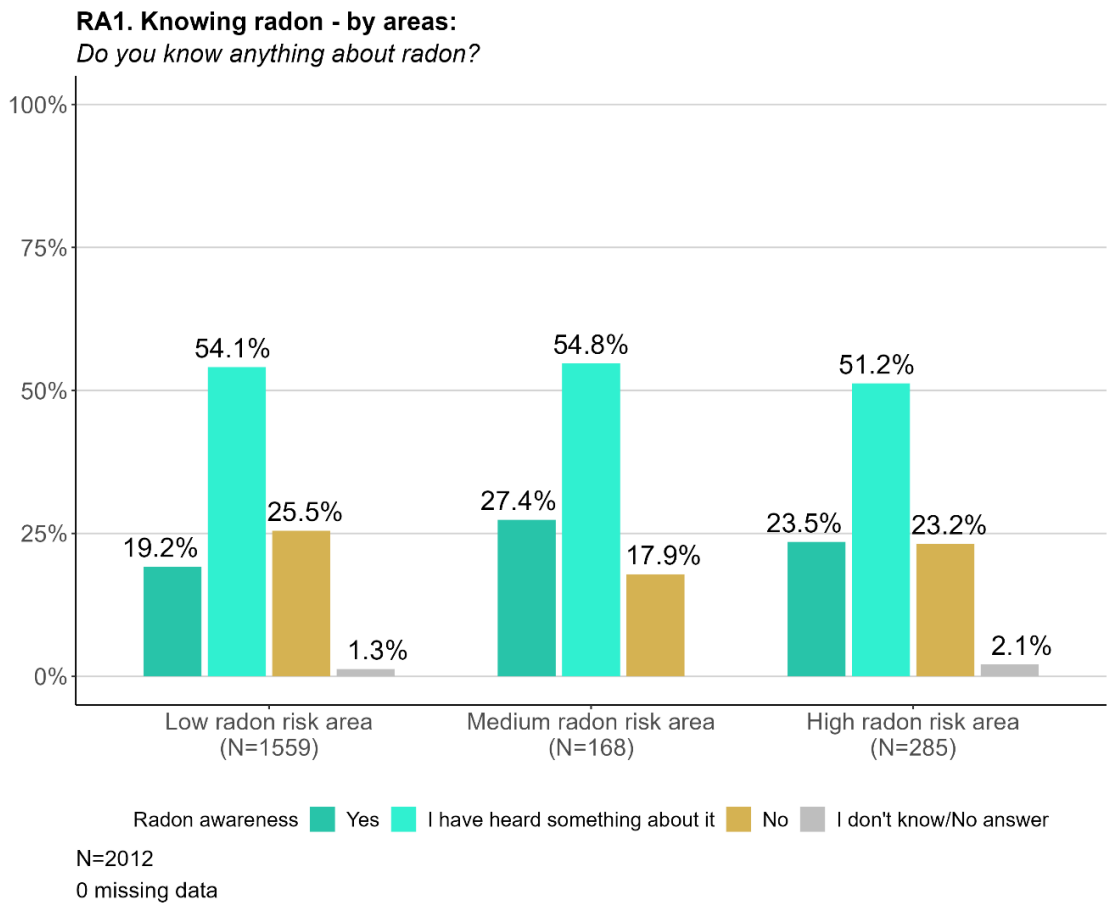


Figure 15: Respondent's awareness of radon divided per risk area. (N = 2012), unweighted sample.

Pearson correlation analyses were conducted to investigate the association between awareness of radon (low score= high awareness) and intention to test or mitigate (high score= high intention). The results indicate that there is a statistically significant but very weak correlation between awareness of radon and intention to test radon concentrations in respondents' homes if advised ($r = -.088$, $p < .001$), intention to measure radon as a precaution ($r = -.071$, $p = .002$), and intention to start the remediation of a home if advised ($r = .-.101$, $p < .001$). These findings suggest that higher levels of awareness of radon may be associated to a greater intention to protect against radon exposure although the correlation coefficients are extremely weak.

When interpreting correlation coefficients, it is important to consider the magnitude of the correlation as well as its statistical significance. A correlation coefficient can range from -1 to +1, where -1 represents a perfect negative correlation, 0 represents no correlation, and +1 represents a perfect positive correlation. In this case, the correlation coefficients are relatively small, indicating a weak relationship between awareness of radon and intention to test or mitigate. However, it is still important to note that these correlations are statistically significant, meaning that they are unlikely to have occurred by chance alone. Even though the associations are weak, they are still meaningful and suggest that there is some association between awareness of radon and intention to protect against radon exposure.

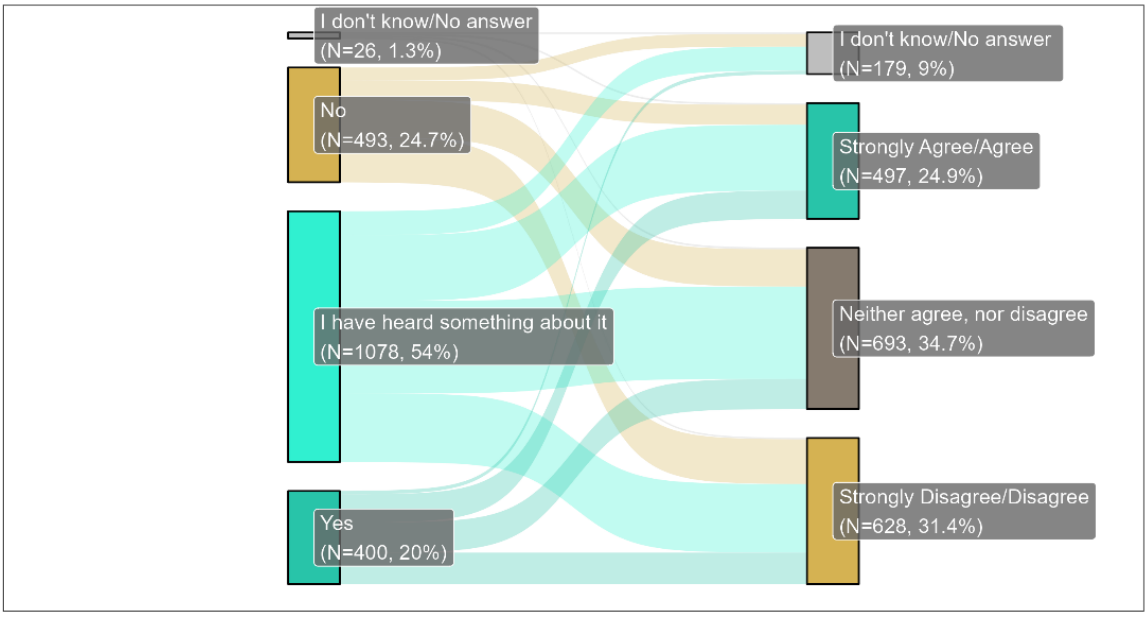
There could be several reasons for the weak correlation coefficients. For example, there may be other factors that influence people's intentions to test or mitigate radon exposure.

The figures below depict the relationship between radon awareness and intentions to test for radon concentrations in respondents' homes. The results demonstrate that there is a lack of consistency between being aware of radon and following the advice to test. For example, out of the 20% of

respondents who reported being aware of radon, only approximately one-third of them would test their homes if advised, while another third would definitely not test, and the remaining third were neutral. This highlights that being aware of radon does not guarantee a corresponding action to protect against it.

We conducted an analysis to examine the relationship between "radon awareness" and "intention to protect from radon" using Pearson's correlation coefficient (Low scores present low intention). The results indicated that while there was a significant association between the two variables, the coefficient was weak ($r = .089$, $p < .001$, $N = 1690$). This suggests that simply being aware of radon does not necessarily lead to individuals taking steps to protect themselves from radon risks. Specifically, the level of agreement for the three items together was used to assess the intention to protect from radon.

The figures below visually present the awareness with each behaviour intention item separately and for all of them together.

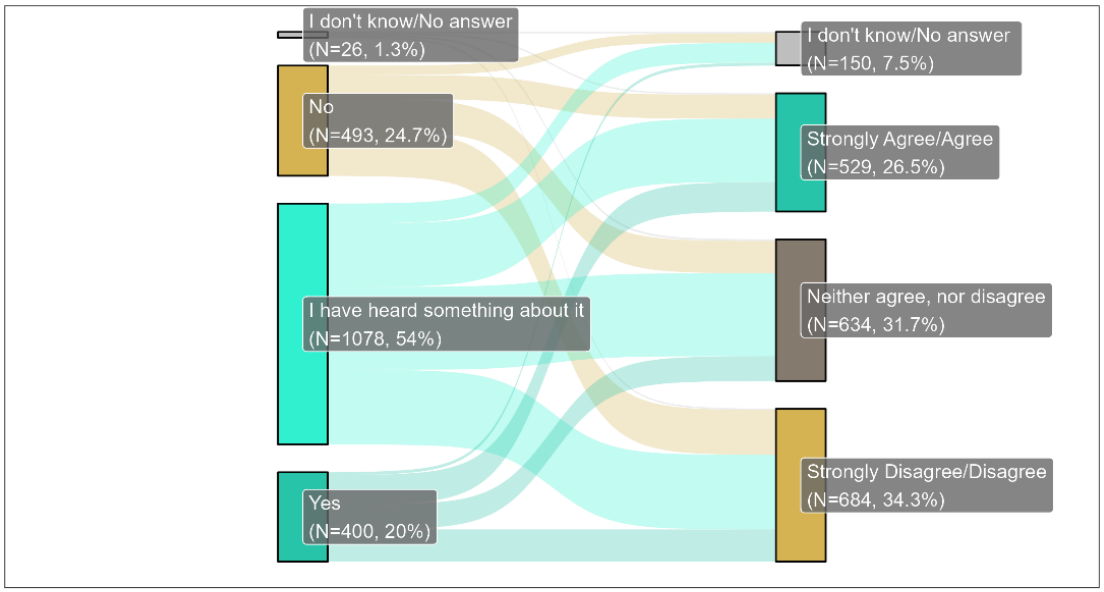


N=1997

15 missing data in "I intend to test radon concentrations in my home if advised"

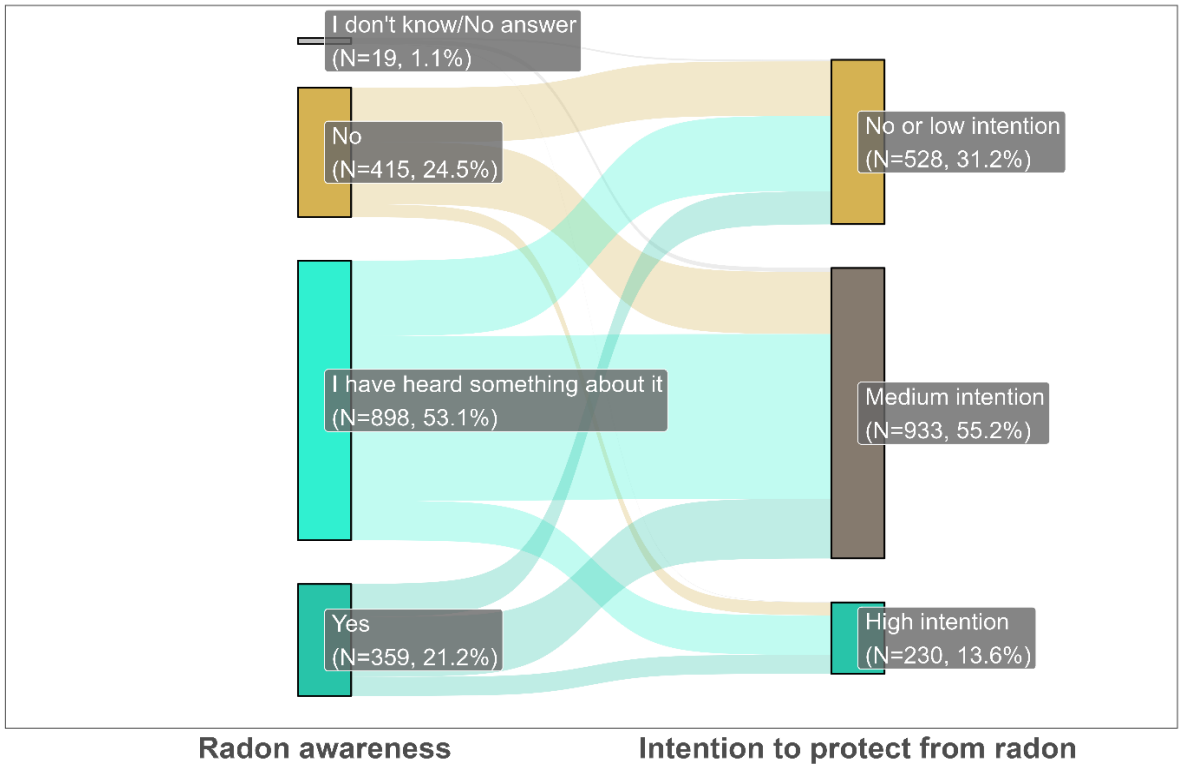
0 missing data in "Do you know anything about radon?"

Figure 16: Awareness of radon and intention to test radon concentrations in home if advised



N=1997
15 missing data in "I intend to measure radon in my home as a precaution."
0 missing data in "Do you know anything about radon?"

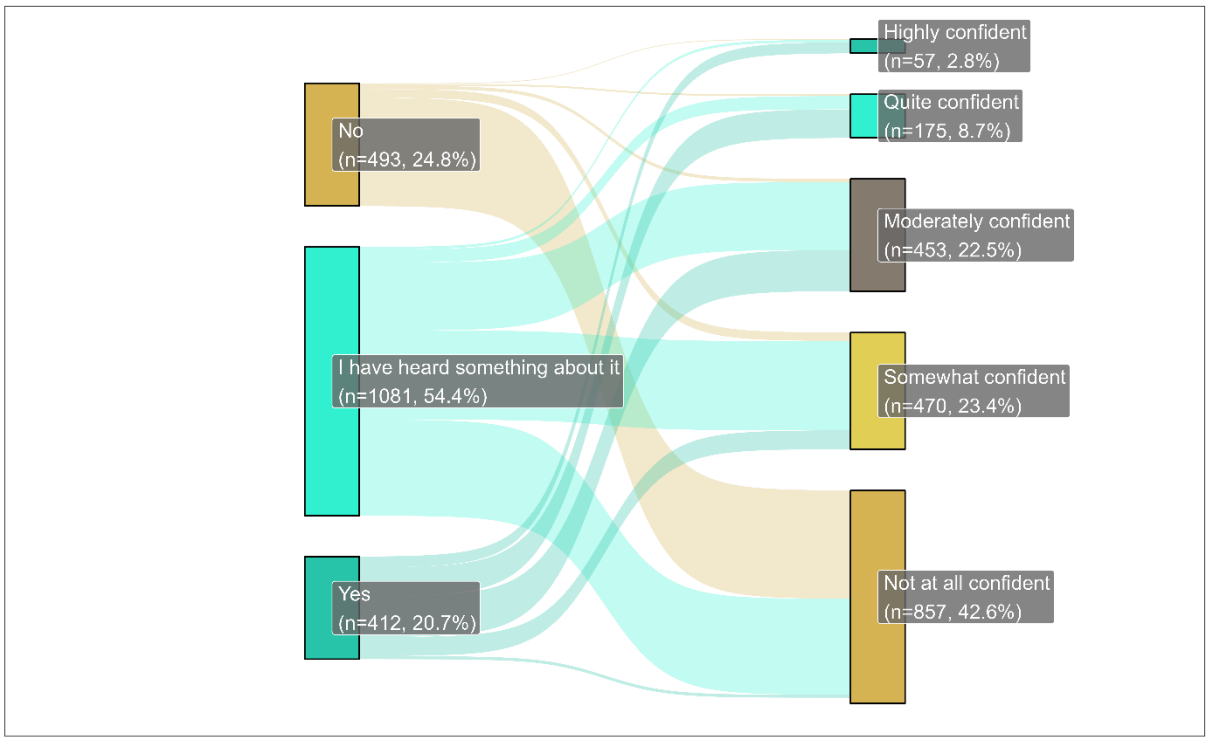
Figure 17: Awareness of radon and intention to test radon concentrations in home as precaution



N=1691
0 missing values in Radon awareness
321 mising values in Intention to protect from radon

Figure 18: Awareness of radon and intention to protect from radon

Additionally, the correlation analysis shows a strong negative association between lower awareness and confidence in knowledge related to radon (r = -.614, p = .001). In other words, people with lower awareness had also lower confidence in their radon related knowledge.



N=1986
0 missing data in "How confident are you in your knowledge to radon?"
0 missing data in "Do you know anything about radon?"
26 respondents answering "I do not know/No answer" in RA1 are excluded from the figure

Figure 19: Radon awareness and confidence in radon knowledge of respondents as combination of RA1 and RA1.a. (N = 1986), unweighted sample.

4.4 Salience

Salience

The term "salience" refers to the level of importance or relevance that an individual or group assigns to the topic of radon. The “salience” has been measured as (dis)agreement with the statement "Radon may be a problem, but I haven't paid much attention to it because there are more important things to deal with". The results suggest that radon risk is not a high priority for most people in Slovenia, about 50% of respondents agreeing that radon could be a problem but not considering it a pressing issue. 36% were neutral, and 13% disagreed or strongly disagreed with the statement. It is surprising that there were no significant differences observed between individuals residing in low, medium, or high radon risk areas in their prioritisation of the radon risk.

We found that individuals who prioritize other issues over radon may have lower intention to test and mitigate against radon exposure. This is based on a significant negative correlation between " agreement with the statement "Radon may be a problem, but I haven't paid much attention to it because there are more important things to deal with," and "intention to test and mitigate" with regards to radon.

The term "salience" refers to the level of importance or relevance that an individual or group assigns to the topic of radon. The salience bias describes a tendency to prioritize noteworthy radon risks or information while ignoring those that are not as attention-grabbing. In this study, respondents' salience was measured by their agreement with the statement "Radon may be a problem, but I have not paid much attention to it because there are more important things to deal with," using a 5-point Likert scale from strongly disagree to strongly agree. The findings indicate that in Slovenia, about 50% of respondents agreed that radon could be a problem, but they had not paid much attention to it as there were more pressing issues. 36% neither agreed nor disagreed, and 13% strongly disagreed or disagreed with the statement. These results suggest that radon risks are not a significant concern for half of the population in Slovenia. It is important to note that there were no significant differences observed between individuals residing in low, medium, or high radon risk areas in their level of concern towards radon.

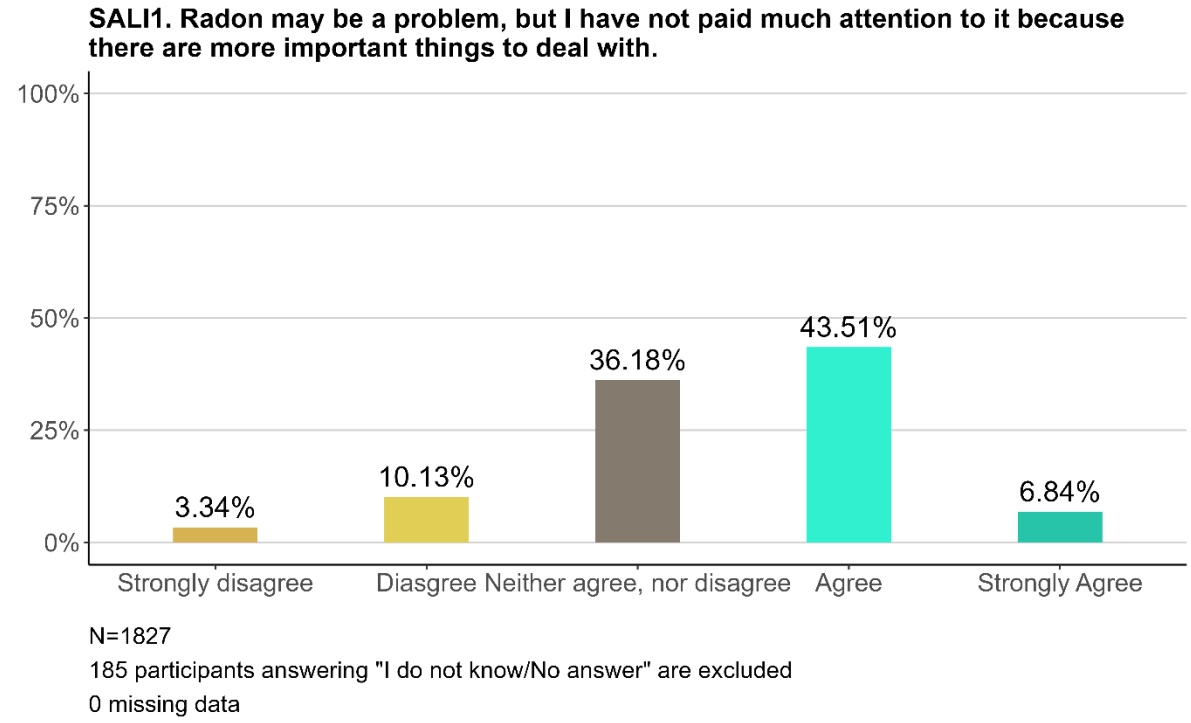


Figure 20: Salience of respondents. (N = 1827), unweighted sample.

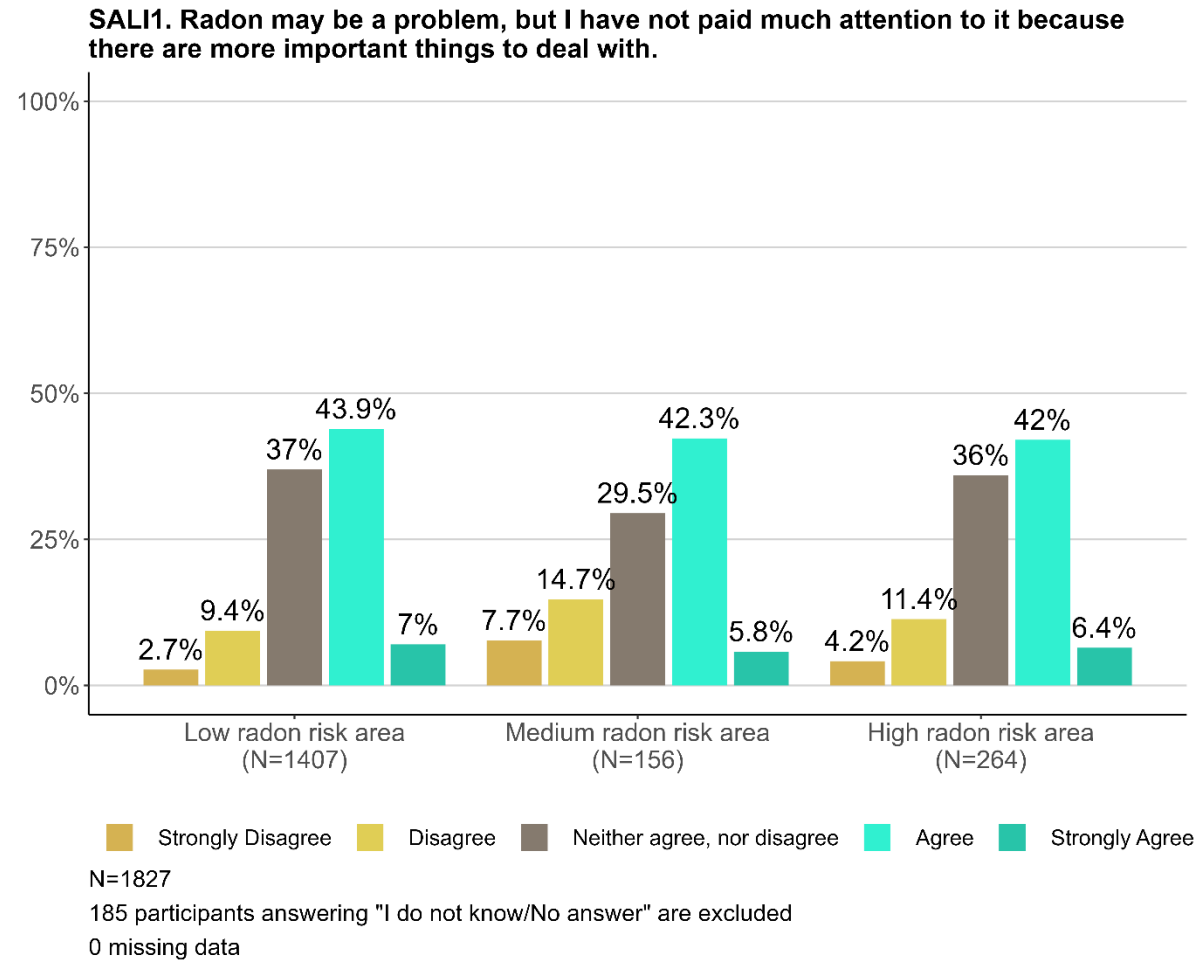
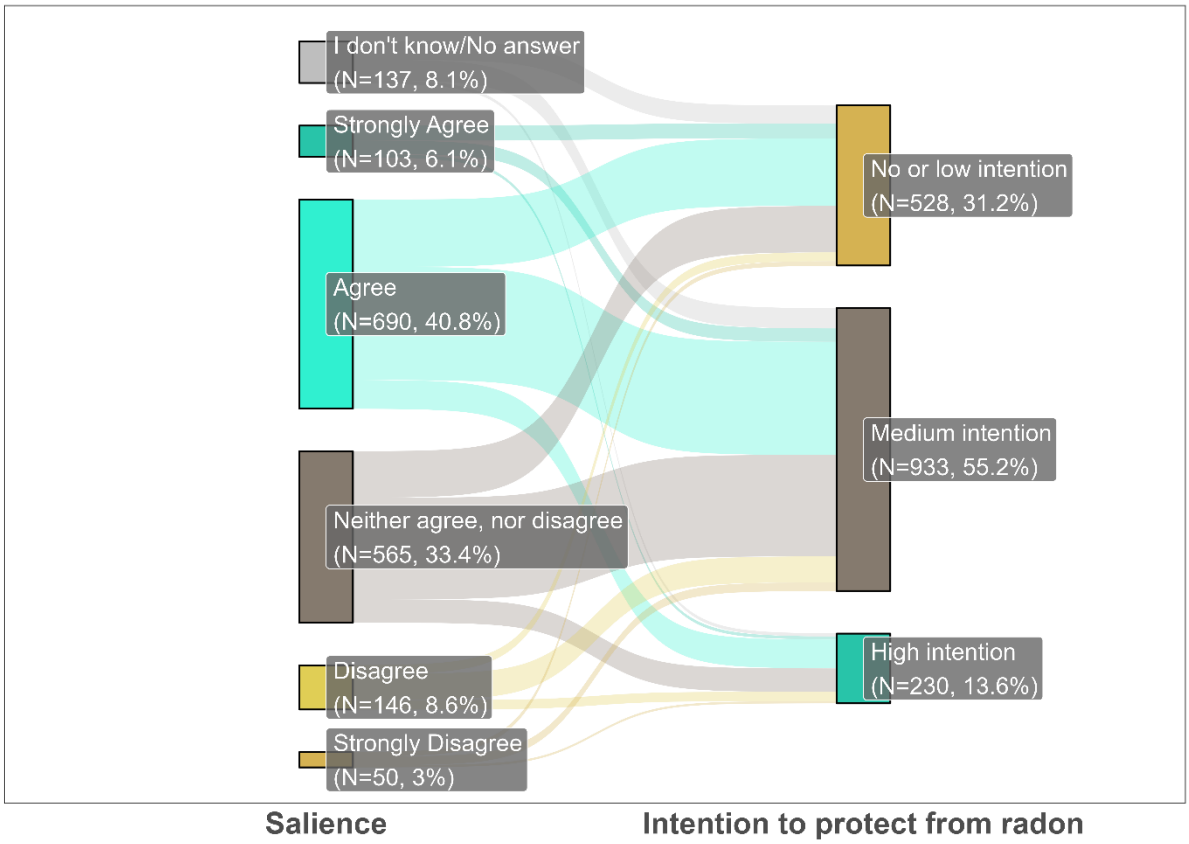


Figure 21: Salience of respondents divided per risk area. (N = 1827), unweighted sample.

We conducted a correlation analysis to investigate the relationship between "salience" and "intention to test and mitigate" with regards to radon. Salience was measured by the level of (dis)agreement with the statement "Radon may be a problem, but I haven't paid much attention to it because there are more important things to deal with." The results revealed a statistically significant, but very weak, negative correlation between lower salience, meaning a greater focus on other priorities than radon, and higher intention to protect from radon ($r = -0.087$, $p = 0.001$, $N = 1552$). This would suggest that individuals who prioritize other issues over radon may be somewhat less likely to test and mitigate against radon exposure.



N=1691

0 missing values in Salience

321 mising values in Intention to protect from radon

Figure 22: Radon awareness and salience of respondents as combination of RA1 and SALI1. (N = 1813), unweighted sample.

4.5 General radiation knowledge

General radiation knowledge: main findings

The analysis of survey results indicates that the general population has limited knowledge regarding exposure to radiation risks. Of particular concern is the significant proportion of individuals who hold the misconception that "Exposure to radiation always leads to radioactive contamination." This misinformation could present a challenge, particularly in a potential nuclear emergency, as people do not differentiate between radiation and irradiation. This lack of understanding has significant implications for ensuring safety and preventing harm from ionizing radiation. However, the study also revealed a higher level of knowledge among the general population concerning the concept of decay, as many knew that every radioactive substance becomes less radioactive with time. This finding is encouraging as it suggests that some foundational knowledge of ionizing radiation potentially exists among the population.

General radiation knowledge refers to the information or understanding related to ionizing radiation that a person has acquired through learning, study, or experience. It can be factual, theoretical, or practical, and it can be acquired through education, training, observation, or research. Knowledge in this study refers to having information or understanding basic principles of ionizing radiation.

The general radiation knowledge is assessed through three leading statements with answering categories 'agree', 'disagree', 'don't know/no answer'. The items were "exposure to radiation and its relation to radioactive contamination.", "The human body is naturally radioactive", and "With time, every radioactive substance becomes more and more radioactive". The first statement concerning radioactive contamination was answered incorrectly by 53.83% of the population. Only 22.61% of the respondents had sufficient knowledge concerning this topic and 23.56% chose not to respond. The table below shows that 29.97% of the population indicated the correct answer on the second statement. Of the remaining respondents, 33.30% selected the wrong response, and 36.73% preferred not to answer. The final question, which probed whether every substance becomes more and more radioactive with time, had the highest percentage of correct answers (46.27%). The results of the residual categories consisted of 23.71% incorrect responses and 30.02% "Don't know/ No answer".

In conclusion, the results of the survey suggest that general radiation knowledge is rather limited in the population, particularly regarding exposure to radiation and radioactive contamination. However, there is a higher level of knowledge regarding the natural radioactivity in the human body.

Table 11: **General radiation knowledge. (N = 2012), unweighted sample**

Item	Correct answer (N = 2012)	Incorrect answer (N = 2012)	Don't know/ No answer (N = 2012)
AW47 Exposure to radiation always leads to radioactive contamination.	22.61% (disagree)	53.83% (agree)	23.56%
AW17 The human body is naturally radioactive.	29.97% (agree)	33.30% (disagree)	36.73%
AW18 With time, every radioactive substance becomes more and more radioactive.	46.27% (disagree)	23.71% (agree)	30.02%

4.6 Radon knowledge

Radon knowledge: main findings

The study aimed to assess the level of radon knowledge among the general public in Slovenia. Radon knowledge refers to the understanding a person has acquired about the risks associated with radon exposure through learning, experience, or campaigns. A total sample of 1493 respondents out of a sample population of 2012 who indicated that they knew or heard about radon, and were asked to respond to 11 statements related to radon exposure.

Overall, respondents demonstrated relatively high knowledge of radon-related topics, with 92% of people in high radon risk areas correctly recognizing that radon is an invisible gas. This fact is also well known among residents in medium and low radon risk areas. Additionally, 89% of respondents across all areas in Slovenia were aware that the risk from radon exposure increases with longer exposure periods. More than 80% of respondents in all radon risk areas also correctly identified that testing is the only way to determine if a home has an elevated radon level. Overall, people demonstrated relatively high knowledge across seven items measuring radon-related knowledge. From this perspective, we can conclude that Slovenians have relatively high knowledge about radon, with individuals from high radon risk areas tending to provide the most accurate responses while those in low and medium risk areas lag slightly behind.

Unfortunately, the study disclosed some important knowledge gaps. The results showed that respondents had a low level of understanding of the symptoms of radon exposure, with only 14.33% correctly identifying that radon does not cause headaches. The study also found that up to 60% of people in Slovenia are not familiar with Becquerel per cubic meter, the unit used to measure radon concentration levels. Only 47.10% of respondents correctly answered that radon concentration in a room is measured in Becquerel per cubic meter. Moreover, only half of the respondents were aware that radon is linked to lung cancer.

Important to acknowledge is a weak but significant association between knowledge and intention to test and mitigate indicating that other factors beyond knowledge may play a more substantial role in shaping respondents' intentions to test and mitigate.

In this study, the term "radon knowledge" is used to describe the information or understanding that a person has acquired through information campaigns, learning or study at schools, or gained through experience about the risks associated with radon exposure. This knowledge may be factual, theoretical, or practical, and can be acquired through various means such as communication campaigns, education, training, observation, or research. In essence, radon knowledge encompasses having a basic understanding of the risks associated with exposure to radon. Assessing the level of knowledge related to radon is of utmost importance, as increasing radon related knowledge and communicating scientific facts about radon have been the primary objectives of all communication interventions conducted in Slovenia in last decades by the radon management authorities.

In the frame of this survey, radon knowledge is probed by presenting 11 items to a specific group of respondents. Out of the population (N = 2012) were 1493 respondents selected based on their response to a prior question (RA1) that inquired whether they are aware of radon. Those who answered that they knew or heard something about it, were included in the group and were asked to respond to the 11 statements. These are: 1) radon causes headaches, 2) radon exposure is linked to lung cancer, 3) radon is radioactive liquid, 4) radon has a strong odour, 5) radon is invisible, 6) radon levels are usually higher in the attic than the basement, 7) testing is the only way to determine if a home has an elevated radon

level, 8) radon can enter homes through cracks in walls and floors, 9) health effects of radon do not show for years, 10) the risks from radon exposure increase the longer you are exposed to it, 11) concentrations of indoor radon are expressed in Becquerel per cubic meter. The answering categories for the items were: consist of “agree”, “disagree”, or “don't know/no answer”. The results are presented in the table below, each partitioned by radon risk zone. The items are ranked from lowest to highest incorrectness, based of the respondent’s answering behaviour.

Radon causes headaches misinformation

The study's findings revealed that respondents had a low level of understanding regarding the symptoms of radon exposure, with only 14.33% correctly identifying that radon does not cause headaches. Of the participants, 34.16% provided an incorrect answer, while more than half (51.51%) did not respond. Interestingly, when analyzing the results by radon risk area, slight variations emerged. The medium-risk area had the highest percentage of incorrect responses (38.03%), followed by the high-risk (36.23%) and low-risk (33.19%) areas. Respondents in the high-risk area were more likely to provide a correct answer (19.57%). These results highlight a concerning level of misinformation among the general public regarding radon exposure symptoms, as opposed to solely addressing a lack of information.

Low understanding of the radon measurements Becquerel per cubic meter

It's crucial for residents to understand the unit of measurement for radon concentration levels, which is expressed in Becquerel per cubic meter (Bq/m3), as well as legal norms and references (such as the advised mitigation level of 300 Bq/m3). This understanding is as important as comprehending speed limits, which are expressed as 50km/h, since all communication between residents and authorities, measurement labs, and mitigation contractors uses the unit Bq/m3. However, our survey results show that up to 60% of people in Slovenia are not familiar with Becquerel per cubic meter. Only 47.10% of respondents correctly answered that radon concentration in a room is measured in Becquerel per cubic meter, while most people admitted to not knowing the answer. Interestingly, only a limited number of people provided the wrong answer. Respondents living in high-risk radon areas tend to answer slightly more correctly on average, while those in low and medium-risk areas are more likely to say that they don't know the answer (56.83%).

Low awareness of high radon concentrations in building basements

Regarding the knowledge question of whether high radon concentrations are expected in the attic or basement, 66.7% of individuals residing in high radon risk areas correctly answered that high radon concentrations are expected in the basement. This knowledge was lower in medium radon risk areas at 56.8%, and even lower in low radon risk areas at 48.7%. Notably, a significant proportion of individuals did not respond to this question, with 40% in low radon risk areas and 28% in high risk areas failing to provide an answer. In high radon risk areas, misinformation was reported by only 5% of individuals.

Knowledge gaps in understanding the health effects of radon exposure.

Only half of the respondents were aware that radon is linked to lung cancer. In high radon risk areas, 12% of the respondents erroneously linked radon with other diseases not scientifically associated with radon exposure. Despite the regular communication of the message that "radon is the second leading cause of lung cancer" by authorities and in various communication interventions, 37% of Slovenians are still unaware of the health effects of radon exposure. This knowledge gap has been observed in all radon risk areas.

High knowledge of other radon-related topics among Slovenians

Overall, respondents demonstrated relatively high knowledge of other related to radon-related topics, with 92% of people in high radon risk areas correctly recognizing that radon is invisible. This fact is also well known among residents in medium and low radon risk areas. Additionally, 89% of respondents across all areas in Slovenia were aware that the risk from radon exposure increases with longer exposure periods. More than 80% of respondents in all radon risk areas also correctly identified that testing is the only way to determine if a home has an elevated radon level. Overall, people demonstrated relatively high knowledge across seven items measuring radon-related knowledge. From this perspective, we can conclude that Slovenians have relatively high knowledge about radon, with

individuals from high radon risk areas tending to provide the most accurate responses while those in low and medium risk areas lag slightly behind.

Looking at all the "school tests" applied in this survey, we can see that 57% of people (out of a sample size of 2012) demonstrated relatively high knowledge about radon by answering at least six of the radon knowledge questions correctly. Most of the people responded correctly to 10 or 11 questions out of 14 questions (general radiation knowledge and radon knowledge test).

In the remainder of the study, we occasionally present results separately for two groups: the population possessing relatively high knowledge (N=1144, 56.8%) - those who answered at least six knowledge questions correctly, and the population with no or low knowledge related to radon (N=868, 43.2%). To improve the understanding of radon-related topics among those with low knowledge, we invited them to watch a 2-minute video where radon, testing, and mitigation were explained. This allowed participants to respond to further questions related to their feelings and assumptions about radon. To avoid any communication effects caused by the intervention, we present results for the two groups - "**video**" and "**no video**" – separately.

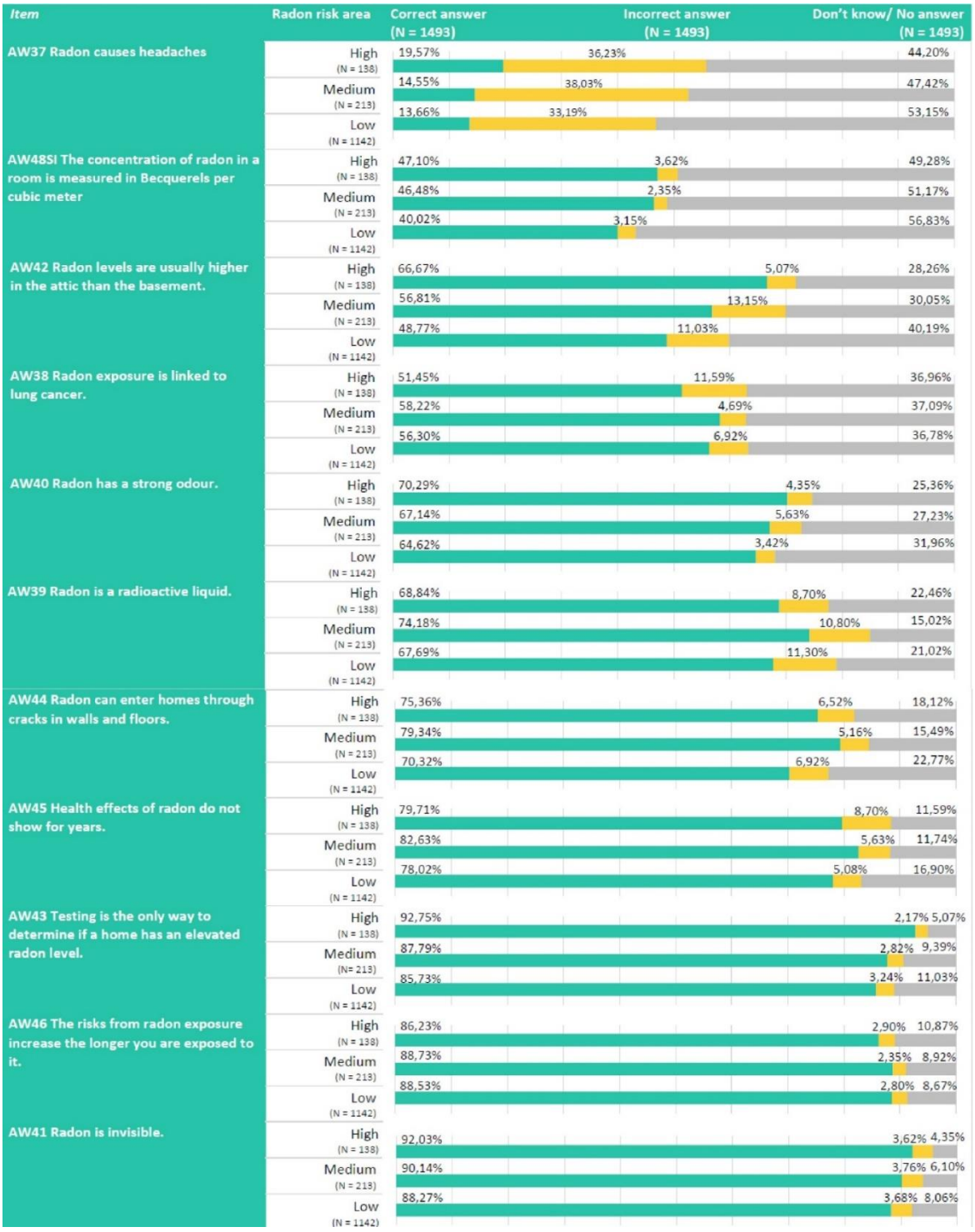


Figure 23: Agreement /Diagreement to Statements on radon.

Weak but Significant Association Found Between Knowledge and Intention to Test and Mitigate

It is important to note that Pearson's correlation coefficient reveals a statistically significant but weak association between respondents' knowledge (measured by calculating the correct responses on 14 knowledge questions) and their intention to test and mitigate. Specifically, the correlation coefficient between these variables is 0.069, which indicates a very small positive association. This result was found to be statistically significant with a p-value of 0.004, suggesting that the observed association is

unlikely to be due to chance alone. While the statistically significant finding is noteworthy, the weak strength of the correlation suggests that other factors beyond knowledge may play a more substantial role in shaping respondents' intentions to test and mitigate.

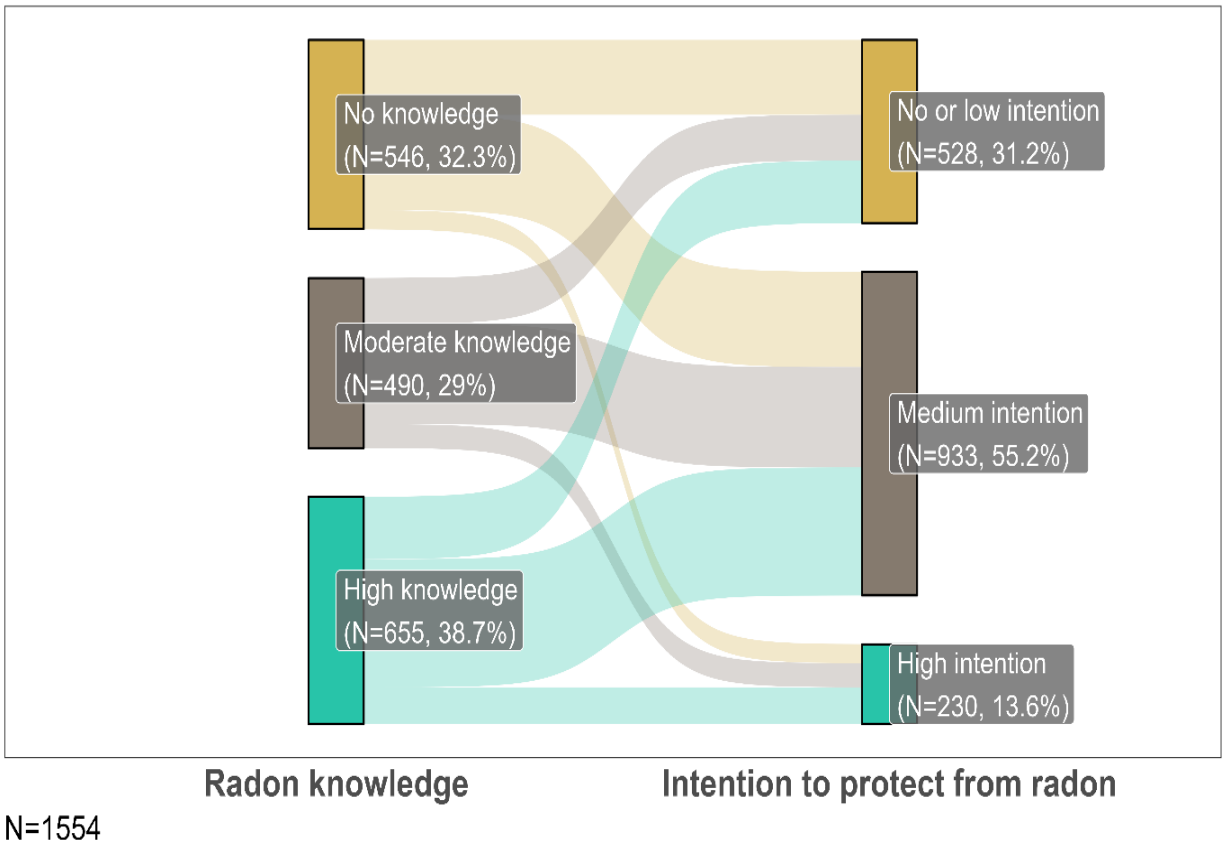


Figure 24: Radon knowledge and intention to protect from radon.

4.7 Risk perception

Risk Perception: main findings

The way in which radon risk is presented can impact how people perceive the risk, but it doesn't always result in a corresponding increase in their willingness to test for and mitigate the risk.

The study uncovered a paradox in the relationship between "radon risk perception" and "intention to test and mitigate". Despite that the formulation of radon risk as " indoor air pollution due to radon the presence of the naturally radioactive gas radon indoors" leads to as higher risk perception than other formulations, the results indicate that the formulation of radon risk as "indoor air pollution due to radon the presence of the naturally radioactive gas radon indoors " is strongly linked to the intention to test and mitigate".

This part of the study explores how individuals perceive different types of risks, including radiological and non-radiological risks. The aim is to provide a more comprehensive understanding of radon risk perception by comparing it to multiple other risks. The survey involved 2012 respondents who were asked to evaluate their risk perception related to 9 risk areas, using a 6-point likert scale with answering options varying from "no risk at all" to "very high risk."

The findings showed that respondents perceive high levels of risk across all items, with environmental pollution having the highest mean score and greatest perceived risk. The risk perception for the accident at the Krsko nuclear power plant was relatively low, with only 34.9% of respondents rating it as a high or very high risk.

The study found that the perception of radon risk among respondents varies depending on how the risk is presented. "Indoor air pollution due to radon" received the highest average score (3.75) among 939 respondents, followed by "The presence of naturally radioactive gas radon indoors" with an average score of 3.57 among 935 respondents. On the other hand, "Natural radiation from the soil or from space" received the lowest average score (3.28) among 1942 respondents.

The study investigated the effect of different formulations, or framing, of radon on risk perception in-depth. The data suggested that respondents perceive the radon risk formulated as "indoor air pollution due to radon" slightly higher than the radon risk formulated as "the presence of the naturally radioactive gas radon indoors". Specifically, 31.1% of respondents rated the risk as high or very high for the "indoor air pollution due to radon" statement, while only 26.4% of respondents rated the risk as high or very high for the "presence of the naturally radioactive gas radon indoors" statement**.**

However, looking at the association between the different formulation of radon risk and intention to test and mitigate demonstrated, that the formulation "the presence of the naturally radioactive gas radon indoors" is slightly stronger associated than the formulation as the "indoor air pollution due to radon", suggesting that risk perception based on the latter formulation may be somewhat less strongly associated with intention to test and mitigate for radon compared to the former formulation.

Based on the study's findings, there was a significant positive correlation between respondents' perception of radon risk (combining both formulations) and their intention to test and mitigate for radon. The Pearson's correlation coefficient showed a moderate positive association between the two variables ($r = 0.263$, $p < 0.001$, $N = 1587$). This suggests that individuals who have a higher perception of radon risk may be more likely to take action and test and mitigate their dwellings for radon, and the reverse. These findings suggest that other factors besides risk perception must also play a significant role in people's decision to test for and mitigate radon.

Radon, communicated as "Indoor air pollution due to radon" receives the highest risk perception rating from the respondents and “natural radiation from the soil or from space" received the lowest risk perception rating from the respondents, where as “"the presence of the naturally radioactive gas radon indoors" was perceived in between the two other formulations.

These findings can inform communication strategies how to convey the risks associated with radon exposure, thereby encouraging more people to test and mitigate their dwellings in case of high levels of radon.

Risk perception refers to how individuals perceive the likelihood of negative events happening and their consequences. It is a subjective judgment that often determines which hazards people are concerned about and how they deal with them. The way people think and feel about the risks they face is also influenced by their personal experiences, beliefs, and values and others. This study investigates the risk perception of different types of hazards and risks, including radiological and non-radiological. It is important to include multiple risks in the study as it allows for a more comprehensive understanding of risk perception. For example, looking at only one particular risk may lead to the impression that the risk perception is relatively high. However, when comparing this risk perception to others, it may become apparent that people estimate some other risks to be even higher. By examining risk perception in the context of multiple risks, the study can provide insights into how individuals prioritize and manage different risks in their daily lives.

The personal risk perceptions of the respondents are surveyed using the following question: “How do you perceive the potential risk to your health within the next 20 years from each of the following sources?”. The possible answering categories on this question consists of a 6-point likert scale with options varying from (1) “no risk at all” to (6) “very high risk”.

In total respondents were asked to evaluate their risk perception related to 9 risk areas being: 1) environmental pollution, 2) climate crisis, 3) radioactive waste, 4) indoor air pollution due to radon, 5) the accident at the Krsko nuclear power plant, 6) the presence of the naturally radioactive gas radon indoors, 7) the use of ionizing radiation for medical tests or treatments, 8) using recycled building material with low levels of radioactivity, 9) natural radiation (from the soil or from the space).

To investigate the effect of different formulations, or framing, of radon on risk perception, two statements were created: "indoor air pollution due to radon" and "the presence of the naturally radioactive gas radon indoors." A total of 2012 respondents were divided into two groups, with the first group given the "indoor air pollution" statement and the second group given the "presence of the naturally radioactive gas" statement.

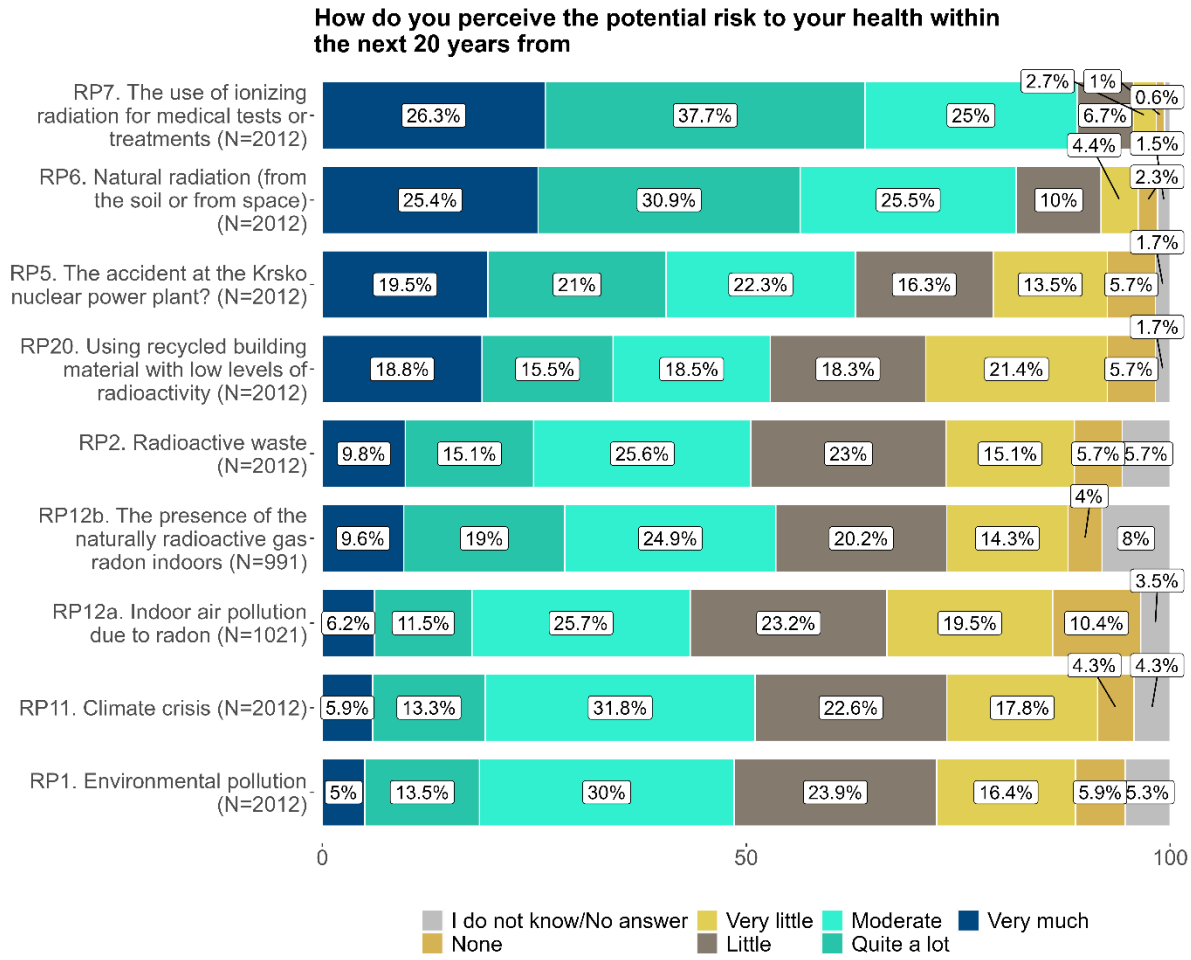


Figure 25: Perceived potential risk to health within the next 20 years from different factors.

The data presented in the figure suggests that overall, respondents perceive a high level of risk across all items, as indicated by the mean scores being above 3. The risk domain with the highest mean score and greatest perceived risk by the respondents is environmental pollution, with a mean of 4.76 and 64.5% of respondents rating it as a very high or high risk. Similarly, the climate crisis was perceived to be a high risk for health in the next 20 years, with a mean of 4.57 and 57.2% of respondents rating it as a very high or high risk.

The risk perception for radioactive waste was also relatively high, with a mean of 4.00 and 41.3% of respondents perceiving it as a very high or high risk. In contrast, the risk perception for the accident at the Krsko nuclear power plant was relatively low, with only 34.9% of respondents rating it as a very high or high risk, while 46.2% of respondents considered it to be no risk or a very low/low risk (with a mean of 3.75 and SD of 1.561).

These findings suggest that environmental and health risks are perceived to be more concerning to the respondents, while the risk perception for nuclear power plant accidents is relatively lower. The items that are rated the lowest on how the respondents perceive the potential risk to their health within the next 20 years are the use of ionizing radiation for medical tests or treatments (with a mean of 3.52, SD of 1.241, 46.7% indicated it being no risk at all / a very low or low risk), using recycled building material with low levels of radioactivity (with a mean of 3.47, SD of 1.253, 48.7% indicated it being no risk at all / a very low or low risk) and natural radiation (from the soil or from space) (with a mean of 3.28, SD of 1.369, 55% indicated it being no risk at all / a very low or low risk).

It is noteworthy to observe that the perception of radon risk among the respondents appears to vary depending on how the risk is formulated. On average, the risk perception was highest for "Indoor air pollution due to radon" (N=939) with an average score of 3.75, followed by "The presence of naturally radioactive gas radon indoors" (N=935) with an average score of 3.57. Conversely, "Natural radiation from the soil or from space" (N=1942) received the lowest risk perception, with an average score of 3.28.

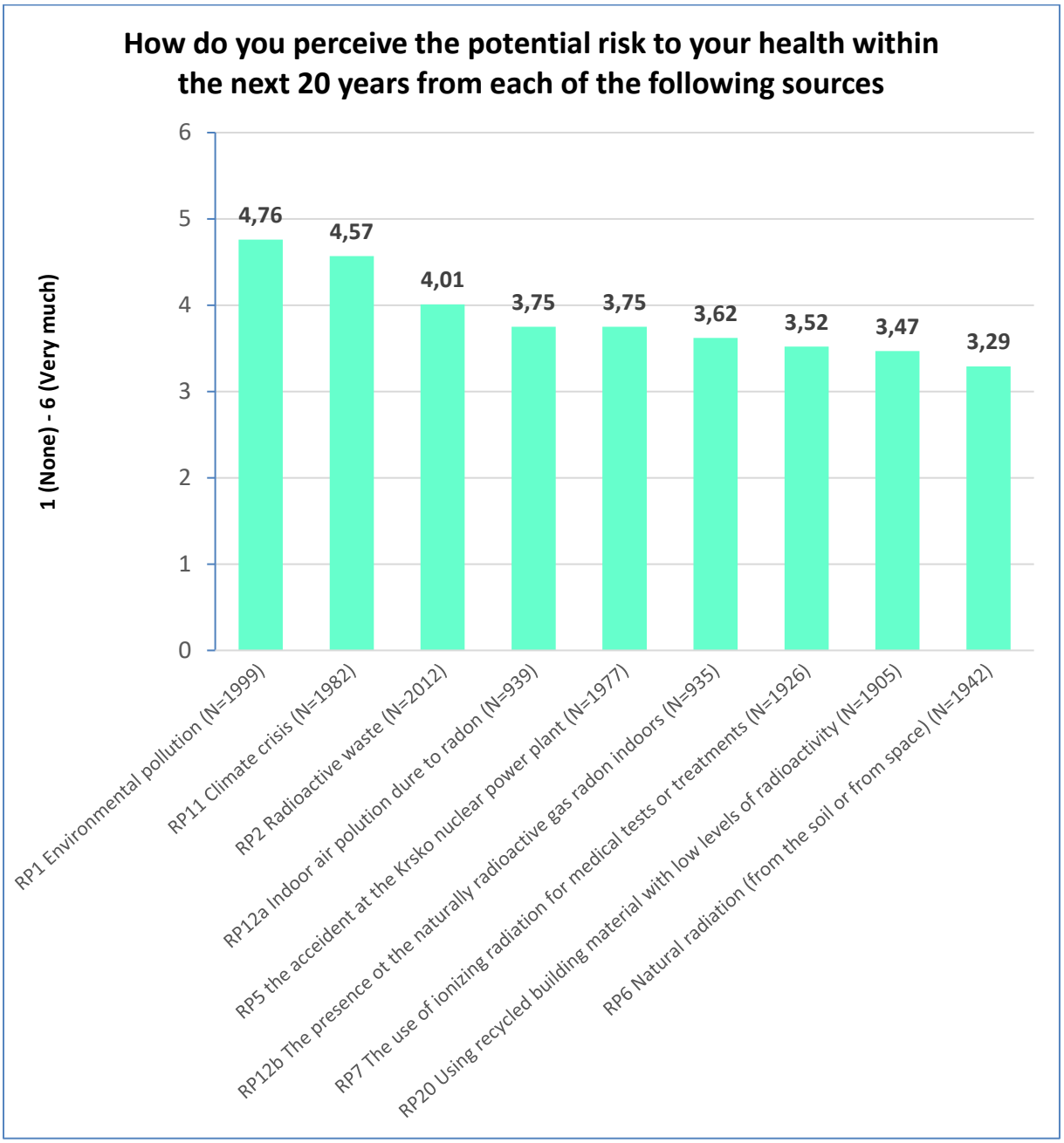


Figure 26: Perceived potential risk to health within the next 20 years from different sources.

Results of the study show that respondents perceive the radon risk formulated as "indoor air pollution due to radon" slightly higher (mean = 3.75, SD = 1.342) than the radon risk formulated as "the presence of the naturally radioactive gas radon indoors" (mean = 3.62, SD = 1.364). Specifically, 31.1% of respondents rated the risk as high or very high for the "indoor air pollution due to radon" statement, while only 26.4% of respondents rated the risk as high or very high for the "presence of the naturally radioactive gas radon indoors" statement. To investigate the effect of the formulation of the statement

on risk perception related to radon, a one-sample t-test was conducted for each formulation separately, comparing the mean risk perception score to a hypothetical value of 3.5 (neutral perception). The formulation "indoor air pollution due to radon" was answered by 935 respondents, with a mean risk perception score of 3.75 (SD = 1.343, SEM = 0.044). The test revealed a statistically significant difference from the neutral perception, $t(934) = 85.467$, $p < 0.001$, with a mean difference of 0.253 and a 95% confidence interval (CI) of the difference between 0.206 and 0.300. Similarly, the formulation "presence of the naturally radioactive gas radon indoors" was answered by 938 respondents, with a mean risk perception score of 3.63 (SD = 1.361, SEM = 0.044). The test revealed a statistically significant difference from the neutral perception, $t(937) = 81.601$, $p < 0.001$, with a mean difference of 0.127 and a 95% CI of the difference between 0.080 and 0.174.

The results indicate that there is a statistically significant difference in risk perception between the two groups, with the group given the statement "indoor air pollution due to radon" perceiving slightly higher risk than the group given the statement "presence of the naturally radioactive gas radon indoors". This is supported by the t-values and p-values obtained, which are both highly significant ($p < 0.001$) and indicate that the observed differences are unlikely to be due to chance.

It is worth noting that the effect size, as measured by the mean difference between the two groups, is relatively small, with a difference of only 0.126 between the two means. However, this may still be practically significant in the radon communication context.

Overall, it appears that the choice of formulation (framing) of the radon risk statement does have a statistically significant influence on risk perception. These results suggest that the formulation "indoor air pollution due to radon" leads to a slightly higher risk perception compared to the formulation "presence of the naturally radioactive gas radon indoors".

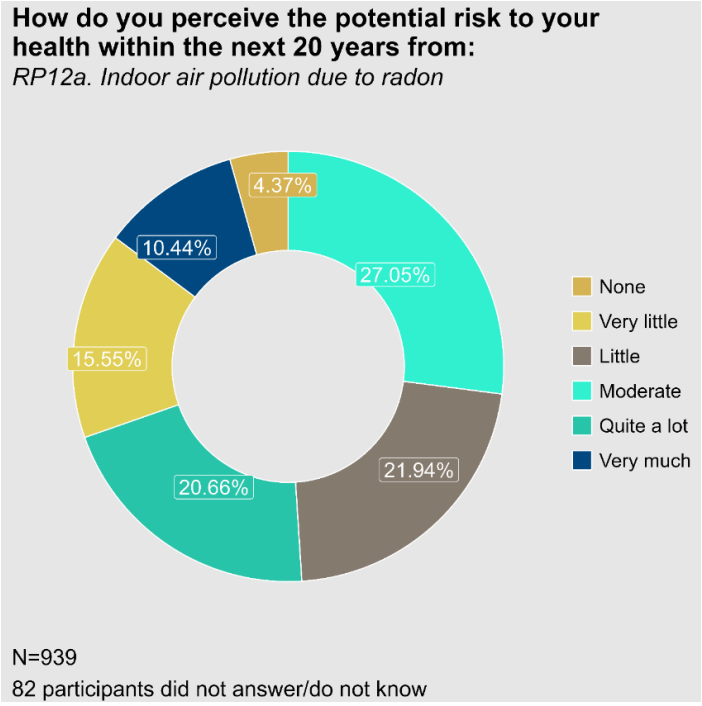


Figure 27: Perceiveed potential risks to health within the next 20 years from indoor air pollution due to radon.

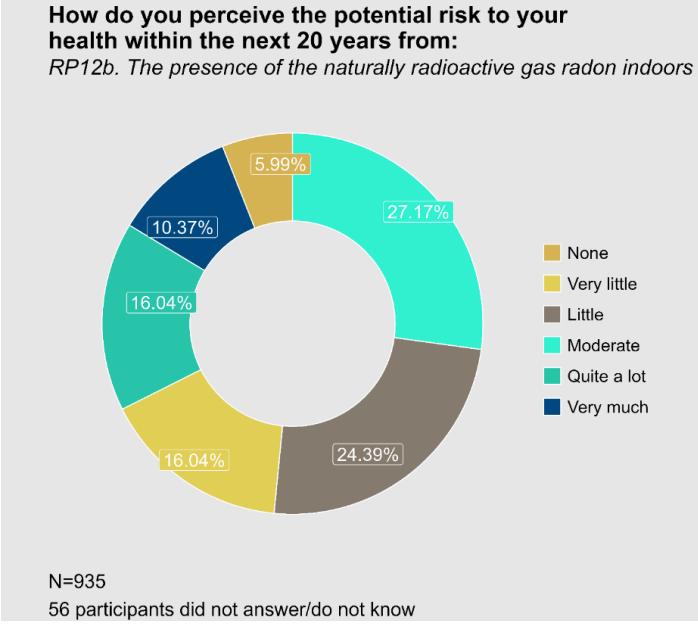


Figure 28: Perceived potential risks to health within the next 20 years from radon indoors.

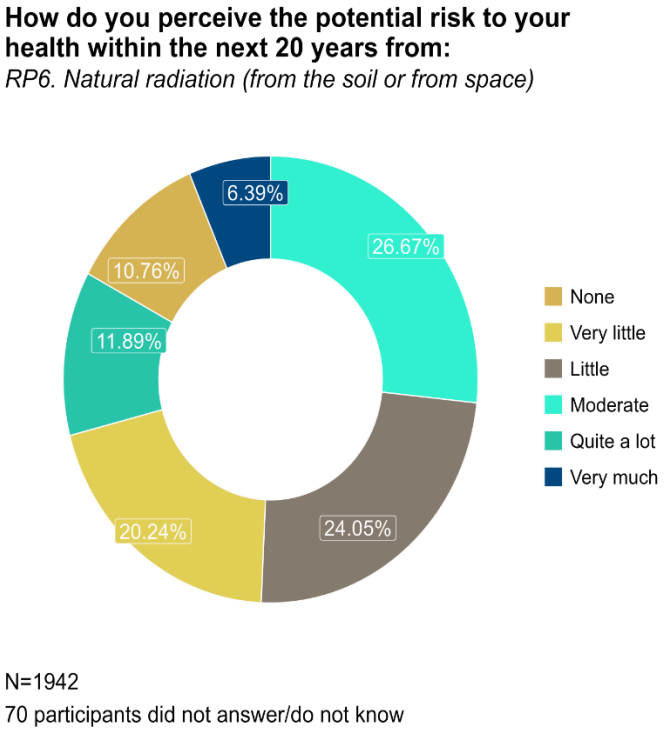


Figure 29: Perceived potential risks to health within the next 20 years from natural radiation.

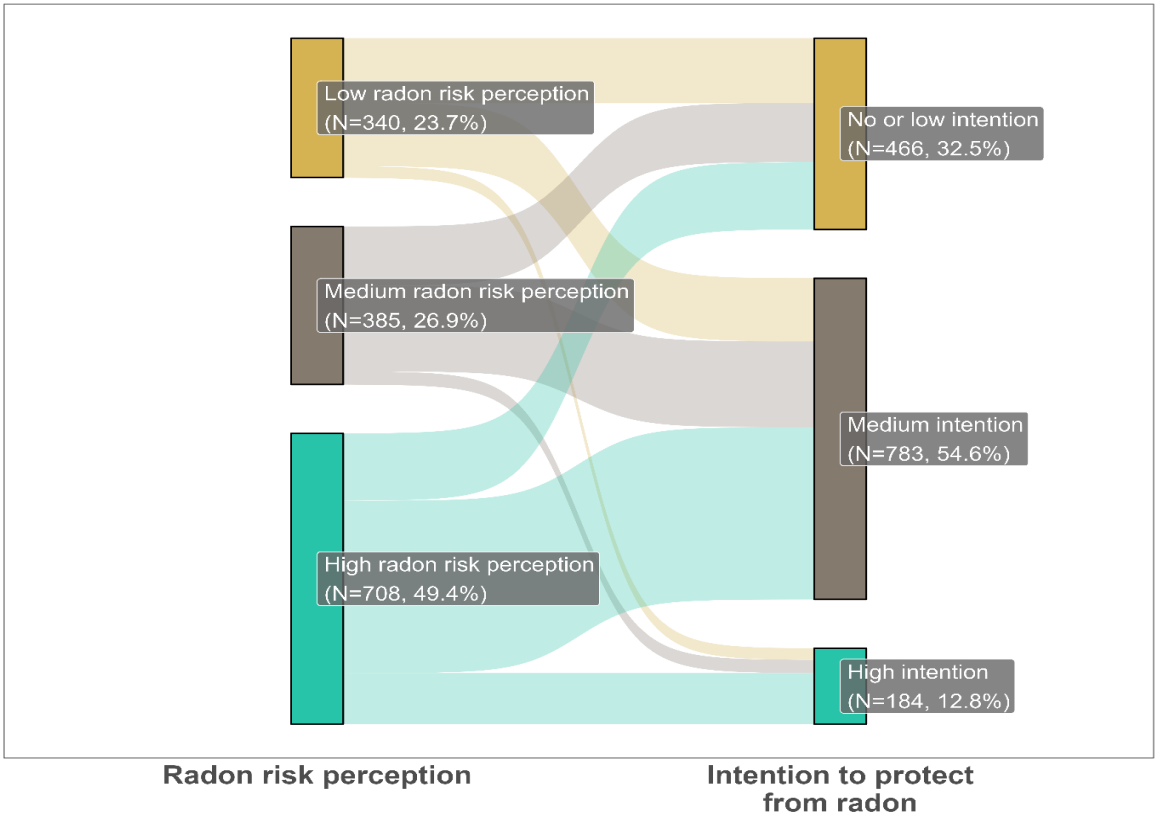
Pearson's correlation coefficient was used to investigate the association between radon risk perception and the “intention to test a dwelling for radon or mitigate if advised”. A statistically significant correlation was found between risk perception of “indoor air pollution due to radon” and “intention to test and mitigate” ($r = .253$, $p < .001$, $N = 792$). Similarly, a statistically significant correlation was found between risk perception of the “presence of the naturally radioactive gas radon indoors” and “intention to test and mitigate” ($r = .276$, $p < .001$, $N = 796$).

The difference between the two associations, as indicated by the correlation coefficients, can be interpreted by comparing their magnitudes. The correlation coefficient for "indoor air pollution due to radon" and "intention to test and mitigate" is r = 0.253, while the coefficient for "the presence of the naturally radioactive gas radon indoors" and "intention to test and mitigate" is r = 0.276.

Since both coefficients are positive and statistically significant ($p < 0.001$), they indicate a positive relationship between risk perception and intention to test and mitigate for radon. However, the coefficient for "the presence of the naturally radioactive gas radon indoors" is slightly larger than the coefficient for "indoor air pollution due to radon", suggesting that risk perception based on the latter formulation may be somewhat less strongly associated with intention to test and mitigate for radon compared to the former formulation.

The figure below displays the relationship between respondents' perception of radon risk (combining the two formulations of radon risk) and their intention to test and mitigate for radon. The Pearson's correlation coefficient showed a statistically significant positive association between the two variables ($r = 0.263$, $p < 0.001$, $N = 1587$). It is worth noting that a significant proportion of respondents had difficulty expressing their radon risk perception, as evidenced by the fact that only 1587 out of 2012 people responded to this question.

The results indicate that there is a positive association between respondents' perception of radon risk and their intention to test and mitigate for radon. Specifically, individuals who perceived a higher risk of radon exposure were more likely to express an intention to take action to test and mitigate for radon. However, these findings also suggest that other factors besides risk perception must also play a significant role in people's decision to test for and mitigate radon. These and previous findings have important implications for public health interventions aimed at reducing radon exposure, as it suggests that increasing awareness of radon risk may be an effective strategy for promoting testing and mitigation behaviours. Nevertheless, the fact that a significant proportion of respondents had difficulty expressing their radon risk perception highlights the need for more effective communication strategies to ensure that individuals are able to accurately assess their risk of radon exposure.



N=1679

Figure 30: Radon risk perception and intention to protect from radon.

4.8 Confidence in authorities for risk management

Confidence in authorities for risk management: main findings

The concept of trust is complex and multidimensional, and in order to better understand it in the context of radon-related risk, a study was conducted to measure trust using three dimensions: confidence, trustworthiness, and competences.

This part of the study focused on the confidence dimension and measured it for authorities undertaking actions to protect the population against risks from nine different sources, including radon.

Results showed that the lowest confidence in authorities was related to the climate crisis and environmental pollution, while the highest confidence was related to an accident in a nuclear installation and the use of ionizing radiation for medical tests or treatments.

Among the radiological risks, the lowest confidence was related to using recycled building materials with low levels of radioactivity and indoor air pollution due to radon, while the highest confidence was related to an accident in a nuclear installation and the use of ionizing radiation for medical tests or treatments. The study also found that respondents had similar attitudes towards the two differently framed radon-related risk items, with an overall confidence of 52-53%. However, the number of respondents who did not respond since it was too difficult to formulate an opinion, varied for each item with the most difficult item for respondents being related to natural radiation from soil and space.

In this study, trust is considered a multidimensional latent construct, meaning that it cannot be directly observed, but rather needs to be inferred from several observable indicators or dimensions. Specifically, the trust construct is measured using three dimensions: confidence, trustworthiness, and competences.

The confidence dimension reflects the extent to which an individual believes that the trustee (i.e., the person or entity being trusted) has the necessary skills and abilities to perform a particular task or job. For example, if someone trusts authorities to manage radon risks, their confidence in the authorities would be related to their belief that the authorites have the knowledge and skills necessary to perform their task successfully.

By measuring trust as a multidimensional construct, this study aims to capture a more nuanced understanding of the concept, and to identify which specific dimensions of trust are most relevant to the radon related context.
In the frame of this survey, the confidence of authorities was measured for the actions they undertake to protect the population against risks from nine various sources of risk. There are: Environmental pollution, Radioactive waste, An accident in a nuclear installation, Natural radiation (from the soil or from space), The use of ionizing radiation for medical tests or treatments, Climate crisis, Indoor air pollution due to radon, The presence of the naturally radioactive gas radon indoors, Using recycled building material with low levels of radioactivity. Here too, respondents were divided in two groups where each of them received one item about radon but framed in a different way than in the other group. This way, one group (N = 932) received the framing “Indoor air pollution due to radon” and the other group received the framing “The presence of the naturally radioactive gas Radon”. The answering categories consisted of a 6-point Likert scale ranging from “none” to “very high”.

As the graphs below show, confidence in authorities has a similar rating among the different risk domains. The lowest confidence is related to climate crisis (62% have no or (very) little confidence with a mean of 3,06, SD 1,19) and environmental pollution (60% have no or (very) little confidence with a mean of 3,10, SD 1,14). The highest confidence among these domains is for an accident in the nuclear installation (68% have moderate or (very) high confidence with a mean 3,95, SD 1,36) and for the use of ionizing radiation for medical tests or treatments (65% have moderate or (very) high confidence with a mean of 3,81, SD 1,26).

Results show that among the radiological risks, the lowest confidence can be related to using recycled building materials with low levels of radioactivity (50% stating they have no or (very) little confidence with a mean of 3,37, SD 1,19), indoor air pollution due to radon, (49% have no or (very) little confidence with a mean of 3,41, SD 1,19), and the presence of the naturally radioactive gas radon indoors (47% have no or (very) little confidence with a mean of 3,44, SD 1,21). Furthermore, the population shows the highest confidence among these radiological risks in the domains of an accident in a nuclear installation (68% stating they have moderate or (very) high confidence with a mean of 3,95, SD 1,36) and of the use of ionizing radiation for medical tests or treatments (65% have moderate or (very) high confidence with a mean of 3,91, SD 1,26).

"How much confidence do you have in the authorities for the actions they undertake to protect the population against risks from each of the following sources?"

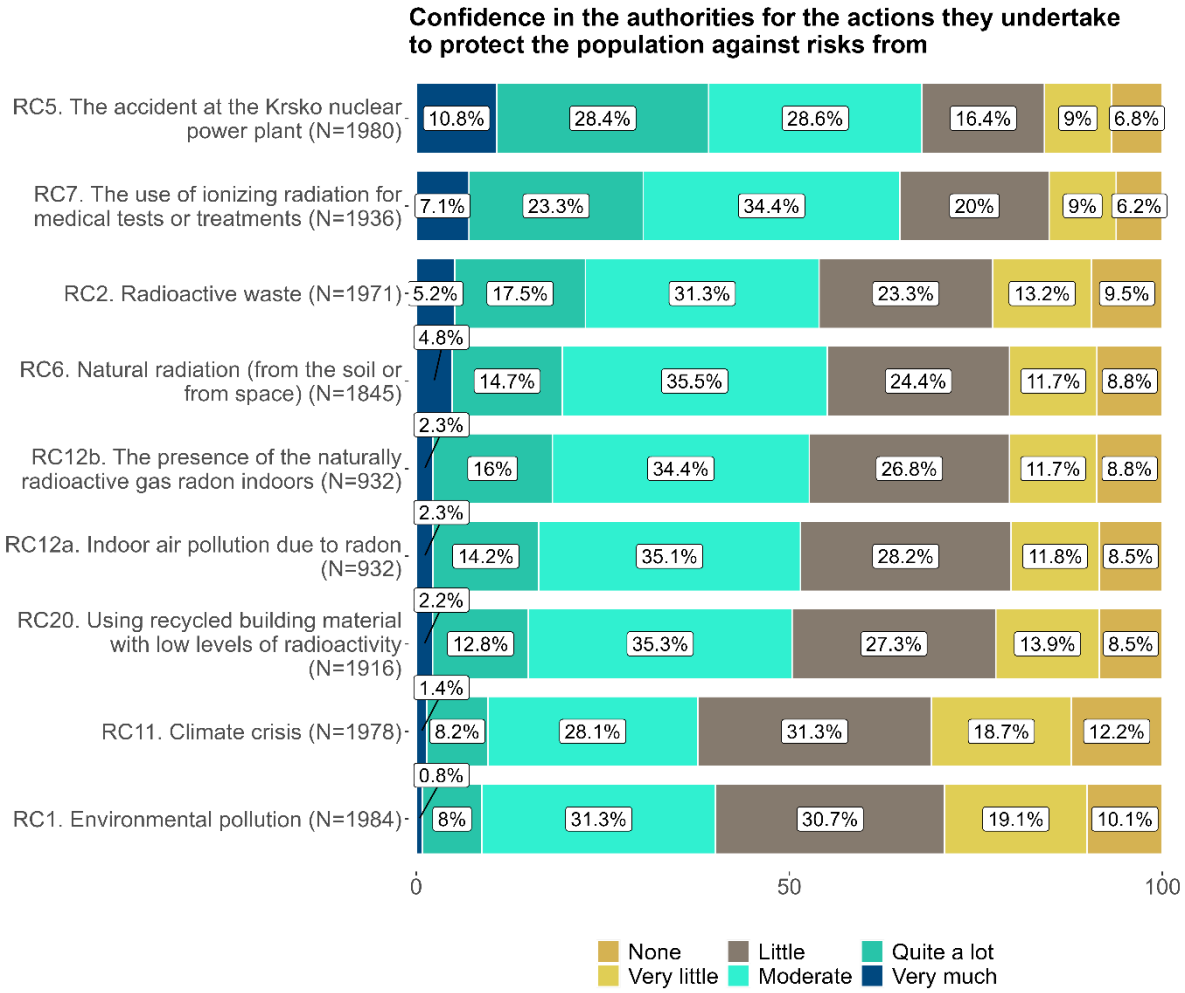


Figure 31: confidence in authorities for the actions they undertake to protect the population against risks sources. Unweighted sample.

As previously mentioned, the respondents were divided into two groups where each of them received one item about radon but framed differently. The pie charts display the degree of confidence in these items (RC12a and RC12b). A similar attitude of the population (N = 932) towards the two items are shown. The overall confidence is 52% for the indoor air pollution due to radon (RC12a with a mean of 3,41, SD 1,19) and 53% for the presence of the naturally radioactive gas radon indoors (RC12b with a mean of 3,44, SD 1,21). The results reveal a very high confidence of 2.25% for both domains. Along the remaining categories of the Likert scale, the items differ only up to 1% or 2%. It is important to state that

the number of respondents that opted for “I don't know” is deviating for each domain. The first item concerning indoor air pollution due to radon has 89 participants who didn't answer the question. However, the second domain on the presence of the naturally radioactive gas radon indoors has a frequency of 59 respondents who preferred not to respond.

Figure 32: Respondent’s confidence in authorities with corresponding confidence interval. Unweighted sample.

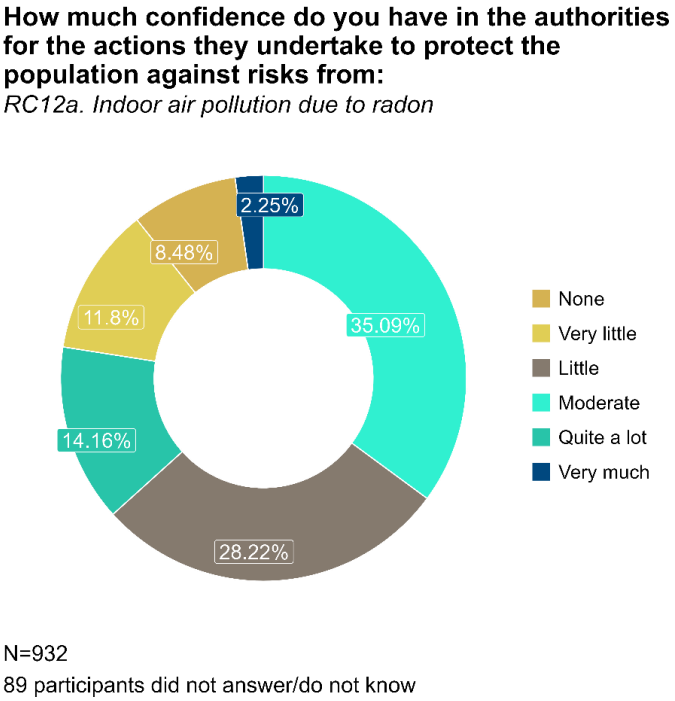


Figure 33: Respondent's confidence in the authorities for the actions they undertake to protect the population against indoor air pollution due to radon. (N = 932), unweighted sample.

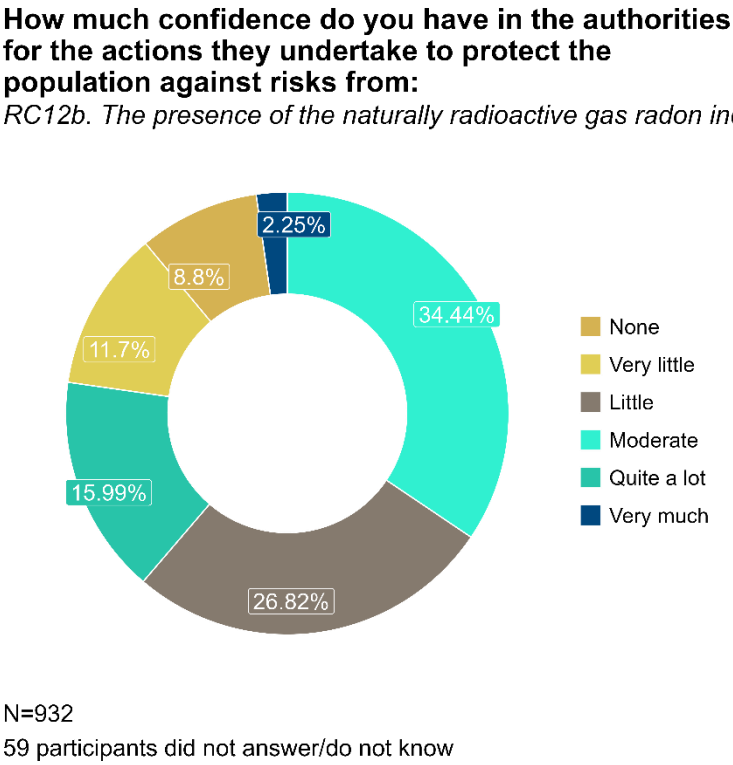


Figure 34: Respondent's confidence in the authorities for the actions they undertake to protect the population against the presence of the naturally radioactive gas radon indoors. (N = 932), unweighted sample.

Table 12: Minimum, maximum, means and standard deviation values concerning respondents' confidence in the authorities for the actions they undertake to protect the population against various risk sources. Weighted sample.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RC1 Environmental pollution	1984	1	6	3.10	1.14
RC2 Radioactive waste	1971	1	6	3.50	1.32
RC5 An accident in a nuclear installation	1980	1	6	3.95	1.36
RC6 Natural radiation (from the social or from space)	1845	1	6	3.50	1.26
RC7 The use of ionizing radiation for medical tests or treatments	1936	1	6	3.81	1.26
RC11 Climate crisis	1978	1	6	3.06	1.19
RC12a Indoor air pollution due to radon	932	1	6	3.41	1.19
RC12b The presence of the naturally radioactive gas radon indoors	932	1	6	3.44	1.21
RC20 Using recycled building material with low levels of radioactivity	1916	1	6	3.37	1.19

4.9 Knowing radon stakeholders

Knowing radon stakeholders

The study aimed to determine the level of familiarity with stakeholders involved radon-related issues among residents in Slovenia. The survey results showed that the Institute Jozef Stefan, National Institute of Public Health, and Ministry of Health were the most well-known stakeholders regarding radon-related issues among respondents. However, contractors for remediation were more well-known than companies measuring radioactivity, and Radonova Laboratories were known the least. This suggests that people may have more difficulties performing tests for radon concentrations in their homes than in mitigating their homes if concentrations exceed legal norms, at least regarding the domaing of knowing who to contact.

Interestingly, the survey found that stakeholders working in radon-related issues are not significantly better known to residents living in high and medium risk radon areas compared to those living in low-risk areas. This indicates a need for more outreach efforts by lesser-known stakeholders to increase awareness and understanding of their roles in mitigating radon risks. Additionally, the study suggests that some stakeholders are better known than others, highlighting a potential communicators for radon risk related topics.

Stakeholders in radon related issues can include individuals, families, and communities who may be affected by radon exposure, as well as organizations and government agencies responsible for regulating radon levels. Some examples of stakeholders in radon related issues include homeowners and landlords who may need to test and mitigate radon levels in their properties, healthcare providers who may need to advise patients on the risks of radon exposure and recommend testing, real estate agents who may need to disclose radon levels to potential buyers, and environmental health agencies responsible for monitoring and regulating radon levels in public spaces. Additionally, construction and renovation companies may be stakeholders in radon related issues as they may need to implement measures to prevent radon from entering buildings during construction or renovations. Finally, policymakers and lawmakers may also be stakeholders in radon related issues as they may need to create and enforce laws and regulations related to radon exposure and mitigation.

In Slovenia, The Slovenian Radiation Protection Administration acts as the owner and implementer of the radon action plan and related strategy. It consults with all ministries involved with radon, including the Ministry of Health and Ministry of Environment, Techical support organisations such as Institute Jozef Stefan, education, other building and construction organisations. In Slovenian, local communities have limited responsibilities for implementation of the national radon action plan. When a problem with exceeded level of radon concentration at a school occurs, then this can involve a public discussion at local level. In addition, there are three providers of radon tests in Slovenia: Radonova (for dwellings), Institute Jozef Stefan, and the Institute for Ocupational safety and health (for complex tests, including schools).

To determine whether the stakeholders are known to the respondents, they were asked to answer the following question: "When it comes to radon, can you tell us if you are familiar with the following organizations/actors?"

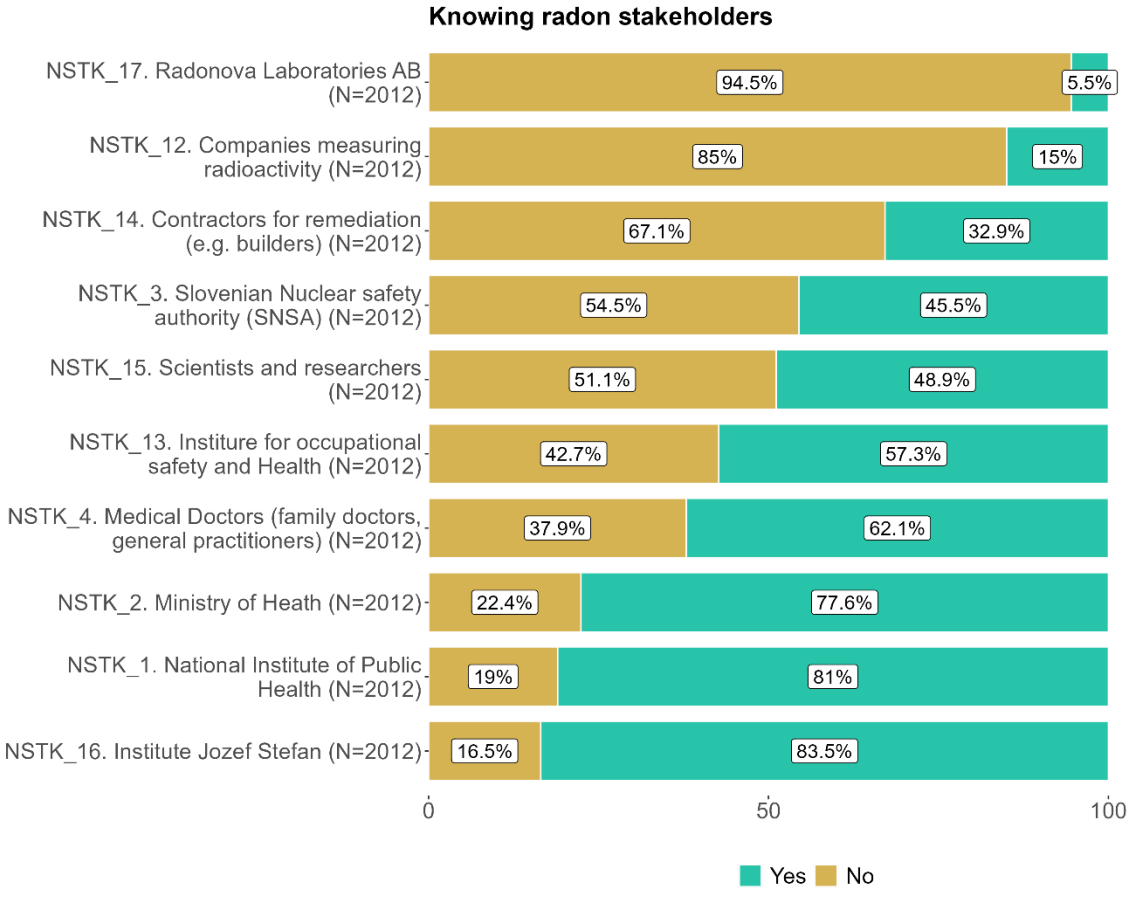


Figure 35: Overview of familiarity with radon stakeholders. (N = 2012), unweighted sample.

The results of the study indicate that the most well-known stakeholders in radon related issues are the Institute Jozef Stefan, known by 83% of respondents, followed by the National Institute of Public Health (81%) and the Ministry of Health (78%). The Institute for Occupational Safety and Health is known by 57% of people, while the Slovenina Radiation Protection Administration is known by 46% of people. Interestingly, the study found that contractors for remediation (33%) were more well-known to respondents than companies measuring radioactivity (15%), and Radonova Laboratories were the least known (6%). These findings suggest that people may face more difficulties in performing tests for radon concentrations in their homes than in mitigating their homes if concentrations exceed legal norms, due to lower knowledge of the responsible authorities for testing.

Despite the fact that stakeholders working in radon-related issues are primarily involved in high and medium risk radon areas, our survey results indicate that they are not significantly better known to residents living in those areas compared to those living in low-risk areas. Furthermore, the results of the survey suggest that some stakeholders are better known than others. For example, the Institute Jozef Stefan and the National Institute of Public Health are better known to residents than Radonova Laboratories and companies measuring radioactivity. This finding could indicate a need for more outreach efforts by lesser-known stakeholders to increase awareness and understanding of their roles in mitigating radon risks.

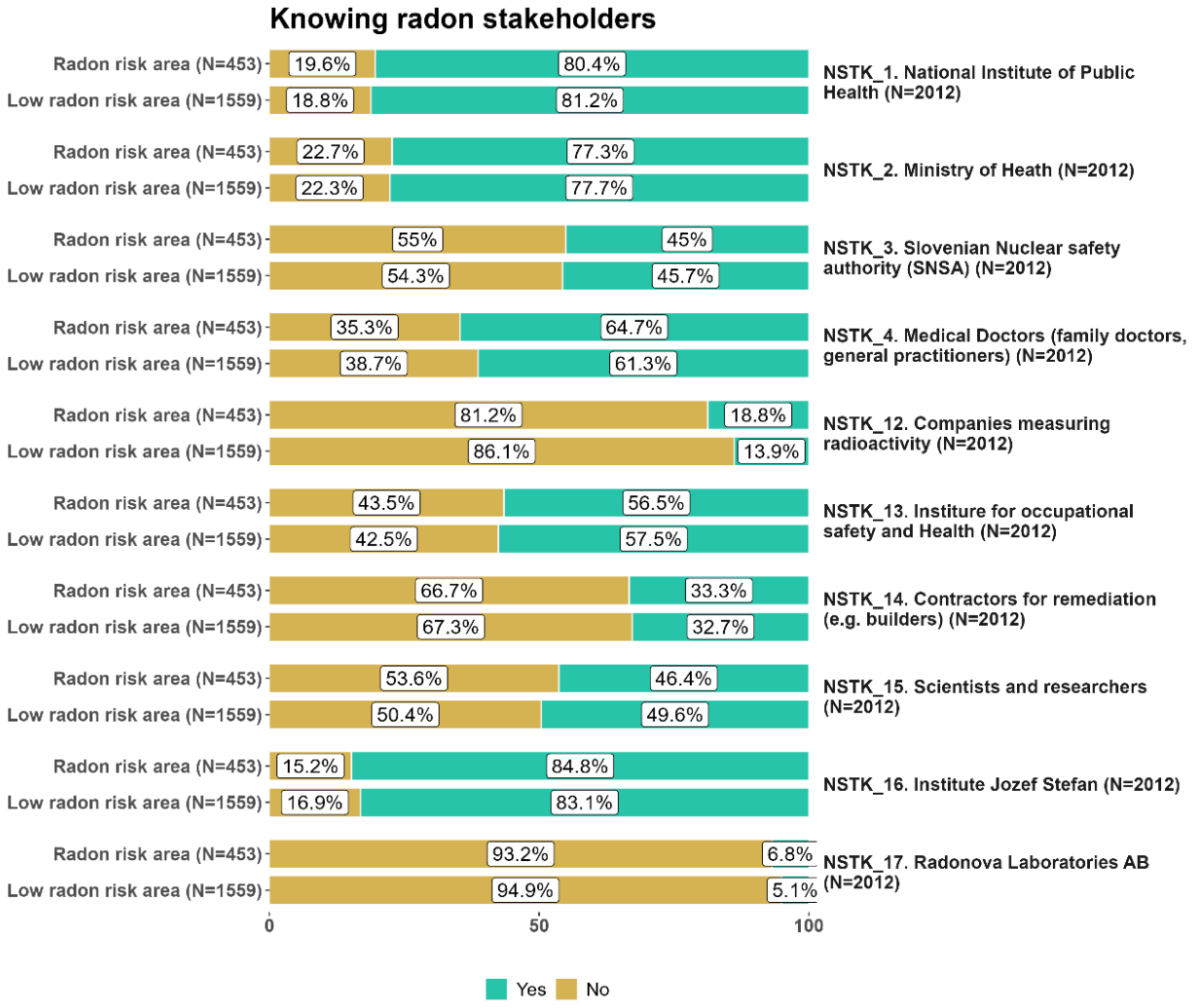


Figure 36: Knowing radon stakeholders in Slovenia per radon risk area.

4.10 Truthfulness of radon stakeholders

Truthfulness of radon stakeholders: main conclusions

According to the results, scientists and researchers from universities and the Institute Jozef Stefan were considered the most trustworthy stakeholders in matters related to radon, with 80% of respondents recognizing them as reliable sources of information about radon risks. The Radiation Protection Administration was the second most trusted stakeholder, with 73% of respondents recognizing it as trustworthy (N=863). On the other hand, contractors involved in remediation, such as builders, were trusted the least, with only 41% of people having confidence in them. The Ministry of Health was also not considered very trustworthy, with only 59% of people having faith in its ability to provide accurate information about radon risks. Interestingly, although not well-known, Radonova laboratories were recognized as rather trustworthy by 69% of those who were familiar with them in Slovenia.

After comparing the recognition of different stakeholders based on their trustworthiness in various radon areas, it was found that there were no significant differences between high and low radon areas in Slovenia. This suggests that people's perceptions of the trustworthiness of stakeholders remain consistent regardless of the radon risk level in their area.

The concept of truthfulness of radon stakeholders refers to the accuracy and honesty of the information provided by these stakeholders regarding radon-related issues. Stakeholders, such as government agencies, research institutions, and companies providing radon mitigation services, have a responsibility to provide accurate and up-to-date information to the public about the risks associated with radon exposure and the most effective ways to reduce those risks.

Ensuring the truthfulness of radon stakeholders is crucial in protecting public health and safety, as inaccurate or misleading information can lead to ineffective mitigation efforts or even harm to individuals. It is therefore important for stakeholders to be transparent in their research findings, to clearly communicate the risks and benefits of various mitigation strategies, and to provide reliable and trustworthy advice to the public. The trustworthiness dimension refers to the degree to which an individual perceives the stekeholder to be honest, reliable, and ethical.

To assess the trustworthiness of Slovenian stakeholders involved in radon-related issues, the survey included a question that asked respondents to give their perception whether the organization or institute was telling the truth about radon risks. The question was phrased as follows: "Can you tell us if you think the organization/institute is telling the truth about radon risks?" Respondents were then asked to rate their agreement on a scale from strongly disagree (1) to strongly agree (5). This allowed researchers to gather information about how the public perceives the truthfulness of various stakeholders involved in radon risk mitigation.

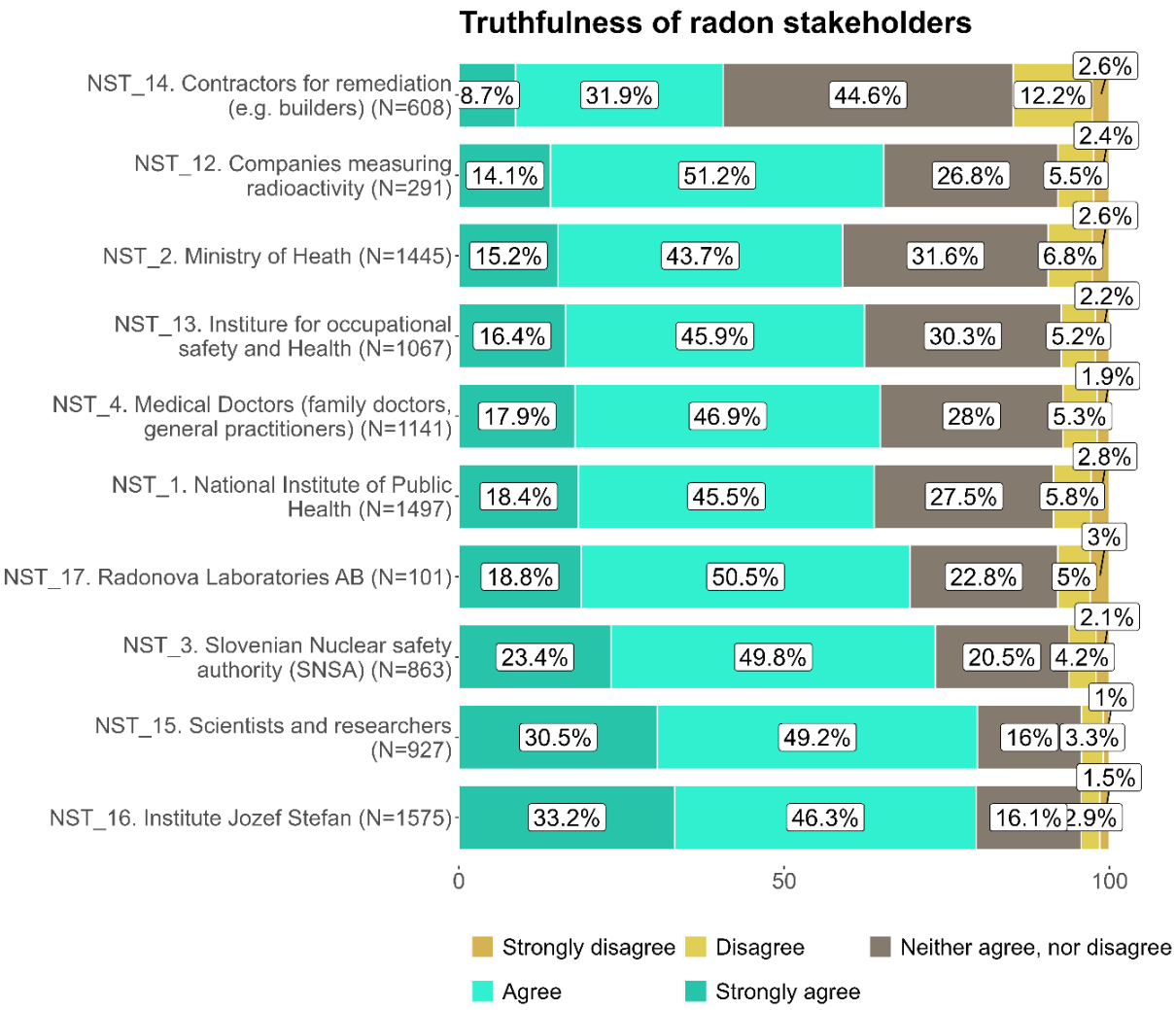


Figure 37: Overview of percieved truthfulness of radon stakeholders. (N = 2012), unweighted sample.

According to the results, scientists and researchers from universities and the Institute Jozef Stefan were considered the most trustworthy stakeholders in matters related to radon, with 80% of respondents recognizing them as reliable sources of information about radon risks. The Radiation Protection Administration was the second most trusted stakeholder, with 73% of respondents recognizing it as trustworthy (N=863). On the other hand, contractors involved in remediation, such as builders, were the least trusted, with only 41% of people having confidence in them. The Ministry of Health was also not considered very trustworthy, with only 59% of people having faith in its ability to provide accurate information about radon risks. Interestingly, although not well-known, Radonova laboratories were recognized as rather trustworthy by 69% of those who were familiar with them in Slovenia.

After comparing the recognition of different stakeholders based on their trustworthiness in various radon areas, it was found that there were no significant differences between high and low radon areas in Slovenia. This suggests that people's perceptions of the trustworthiness of stakeholders remain consistent regardless of the radon risk level in their area.

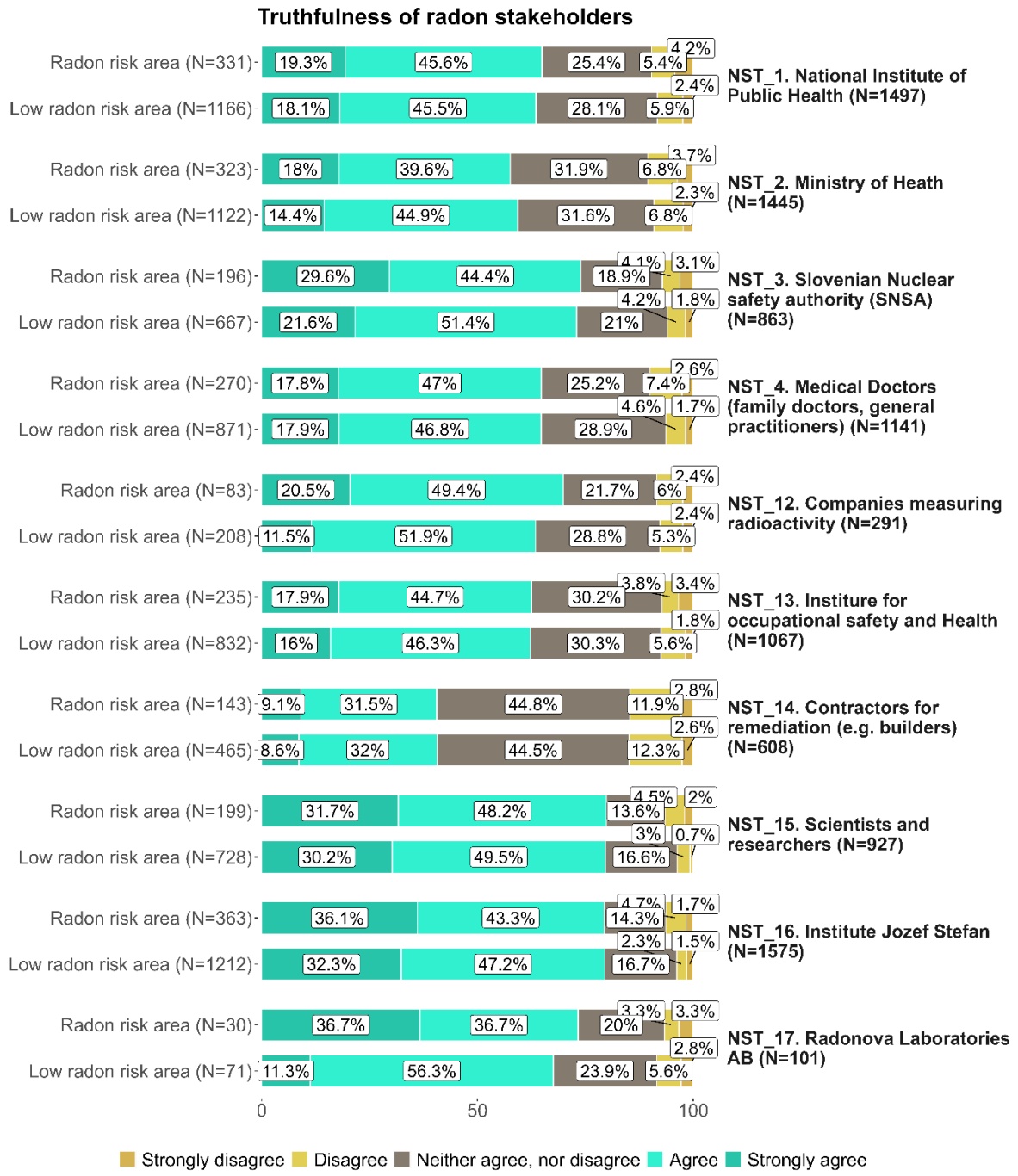


Figure 38: Overview of percieved truthfulness of radon stakeholders per radon risk area.

4.11 Competence of radon stakeholders

Competence of radon stakeholders: main findings

The survey aimed to gauge public perception of the technical competence of various stakeholders involved in managing the radon risk. Respondents were asked to rate their level of agreement with the statement "technically competent with regard to radon mitigation" for each stakeholder on a scale of 1 to 5.

The results revealed that the Institute Jozef Stefan and the Slovenina Radiation Protection Administration were the most technically competent stakeholders in radon risk mitigation, recognized by 79.8% and 79.1% of the population, respectively. Scientists from universities were also highly regarded, with 76.7% of respondents recognizing their technical competence in managing radon risks. Conversely, medical doctors and the Ministry of Health were perceived as the least technically competent stakeholders in addressing radon risks. The building industry and contractors involved in remediation were only recognized as technically competent by 52.6% of the population, despite their crucial role in managing radon risks. Radonova laboratories were recognized as a technically competent stakeholder, with 75% of those who knew them considering them competent.

There were no significant differences in the recognition of technical competence of radon-related stakeholders in high and low radon risk areas, except for Radonova laboratories, which were recognized as particularly competent in high radon risk areas. These results indicate that the public's perception of the technical competence of stakeholders in radon risk mitigation is consistent across different radon risk areas, with the exception of Radonova laboratories, which are perceived as particularly competent in areas with higher radon risk levels. Overall, these findings offer valuable insights into how the public perceives the technical competence of different stakeholders involved in managing radon risk.

The competences dimension encompasses a range of skills, knowledge, and experience possessed by the stakeholdes that are relevant to radon related issues. Competences can refer to technical expertise, as well as soft skills such as interpersonal abilities. One important concept related to technical competence in radon mitigation is the ability to design and implement effective mitigation systems. Technical competence in this context means having a thorough understanding of the scientific principles and engineering practices involved in reducing radon levels in indoor spaces. This includes knowledge of building materials, construction techniques, and ventilation systems, as well as an understanding of how radon enters and moves through buildings. Technically competent radon mitigation professionals are able to assess a building's unique radon risk factors and design a mitigation system tailored to its specific needs. They are also able to install and maintain the system in compliance with relevant regulations and standards. Additionally, technical competence in radon mitigation also involves proficiency in using specialized equipment and tools, such as radon monitors and fans, and being able to interpret the data collected by these instruments accurately. Overall, technical competence is a crucial aspect of ensuring the effectiveness and safety of radon mitigation systems.

In the survey, we sought to measure the public's perception of the technical competence of different stakeholders involved in radon risk management. To do so, respondents were asked to rate their level of agreement with the statement for each particular stakeholder “technically competent with regard to radon mitigation" on a scale ranging from strongly disagree (1) to strongly agree (5). This allowed us to

gather information on how the public perceives the technical expertise of different stakeholders in addressing the radon risk.

The results of the survey indicate that the Institute Jozef Stefan and the Slovenina Radiation Protection Administration are considered the most technically competent stakeholders in radon risk mitigation, with 79.8% and 79.1% of the Slovenian population recognizing their competence, respectively. Scientists from universities were also highly regarded, with 76.7% of respondents considering them technically competent in managing radon risks. On the other hand, medical doctors and the Ministry of Health were recognized as the least technically competent stakeholders, which may be expected due to their different roles in addressing radon risks.

Interestingly, the building industry and contractors involved in remediation were only recognized as technically competent by 52.6% of the population, despite being a key technical stakeholder. Furthermore, the Radonova laboratories were recognized as a rather technically competent stakeholder, with 75% of people who knew them perceiving them as technically competent. These results provide valuable insights into the public's perception of the technical competence of different stakeholders in managing radon risks.

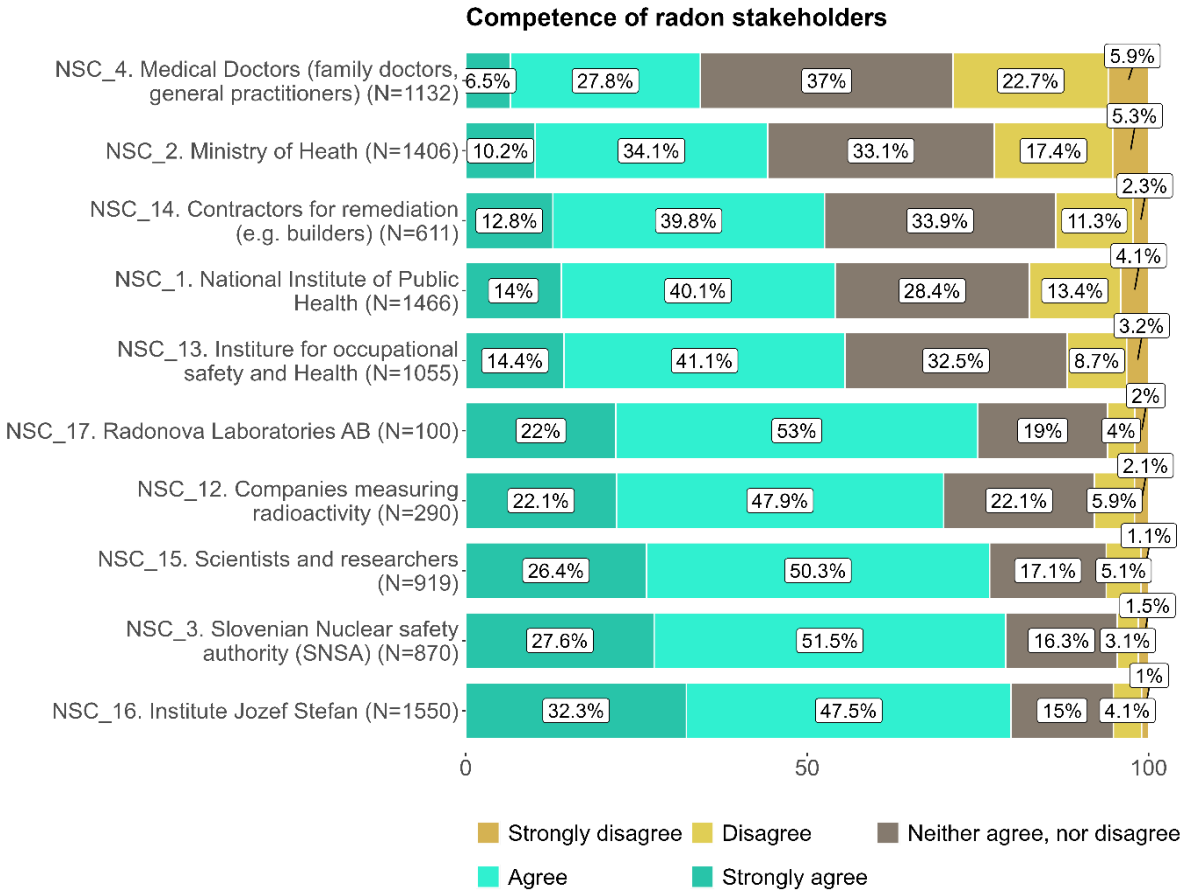


Figure 39: Overview of competence of stakeholders. (N = 2012), unweighted sample.

Upon comparing the recognition of technical competence of radon-related stakeholders in high radon risk areas and low radon risk areas, no statistical differences were observed, except for the Radonova laboratories. Interestingly, the high technical competence perception of Radonova laboratories was even more pronounced in high radon risk areas, indicating that their expertise is particularly valued in

areas with greater risk. These findings suggest that the public's perception of the technical competence of stakeholders in radon risk mitigation is consistent across different radon risk areas, with the exception of Radonova laboratories, which are recognized as particularly competent in areas with higher radon risk levels.

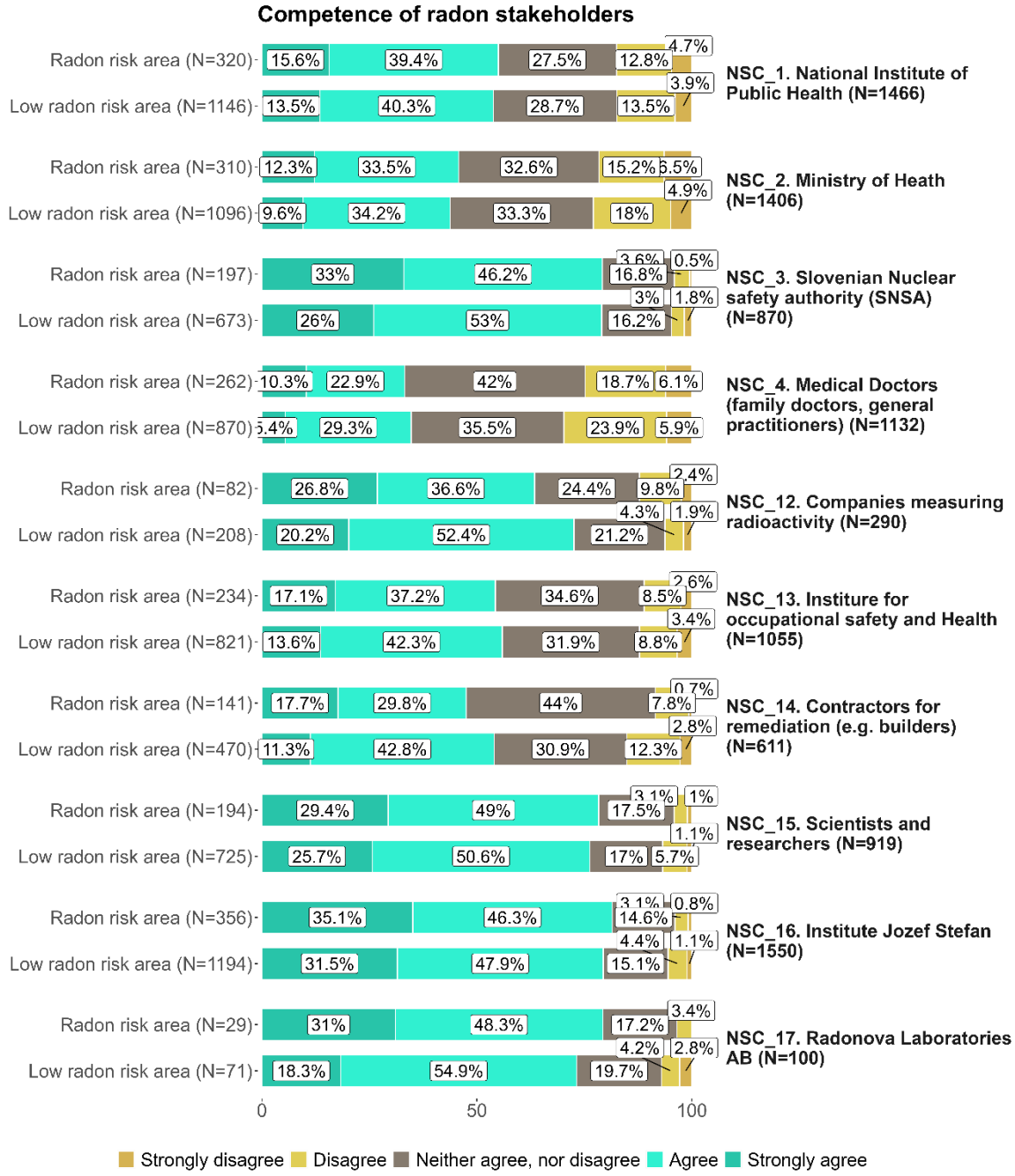


Figure 40: : Overview of competence of stakeholders per radon risk area.

Trust: main conclusions

The concept of trust is complex and multidimensional, and in order to better understand it in the context of radon-related risk, we measured trust using three dimensions: confidence, trustworthiness, and competences.

The survey revealed that trust is a multi-dimensional concept that encompasses various aspects, such as knowing the stakeholder, their technical competence, and their ability to tell the truth about radon risks. The Institute Jozef Stefan emerges as the most trusted stakeholder in radon risk management in all three domains of stakeholder familiarity, truthfulness, and technical competence, according to a recent survey. The results also showed that health authorities are well-known but not considered the most competent or trustworthy stakeholders in a topics related to radon. In contrast, scientists from universities and the Slovenina Radiation Protection Administration are relatively well-known, and their competences and trustworthiness are also recognized. The lowest level of trust was placed in contractors for remediation, such as builders and companies measuring radioactivity. The findings suggest that stakeholder familiarity, truthfulness, and technical competence are all critical components in establishing trust in radon risk management stakeholders.

The concept of trust is complex and multidimensional, and in order to better understand it in the context of radon-related risk, we measured trust using three dimensions: confidence, trustworthiness, and competences.

Trust may be a critical component in managing radon risks, as it affects people's willingness to take action to reduce their exposure to this harmful gas. In radon risk management, trust can be understood as a multi-dimensional concept that encompasses various aspects, such as knowing the stakeholder, the stakeholder's technical competence, and their ability to tell the truth about radon risks.

The figures below depict three concepts related to trust in radon risk management: stakeholder familiarity, truthfulness, and technical competence. The survey results show that the Institute Jozef Stefan is the most known, trustworthy, and competent stakeholder in radon risk management, as recognized by 79.8% of respondents. Health authorities are also well known, but not recognized as the most competent or trustworthy stakeholders. On the other hand, scientists from universities and the Slovenina Radiation Protection Administration are relatively well known, and their competences and trustworthiness are also recognized by the Slovenian population. The lowest level of trust, although not well known, is placed in contractors for remediation, such as builders and companies measuring radioactivity.These findings suggest that stakeholder familiarity, truthfulness, and technical competence are all crucial components in establishing trust in radon risk management stakeholders. The Institute Jozef Stefan emerges as the most trusted stakeholder in all three domains, indicating that it has successfully established a reputation as a reliable and competent authority in radon risk management. The findings also highlight the need for contractors and other technical stakeholders to improve their communication and establish themselves as trustworthy and technically competent actors in radon risk management.

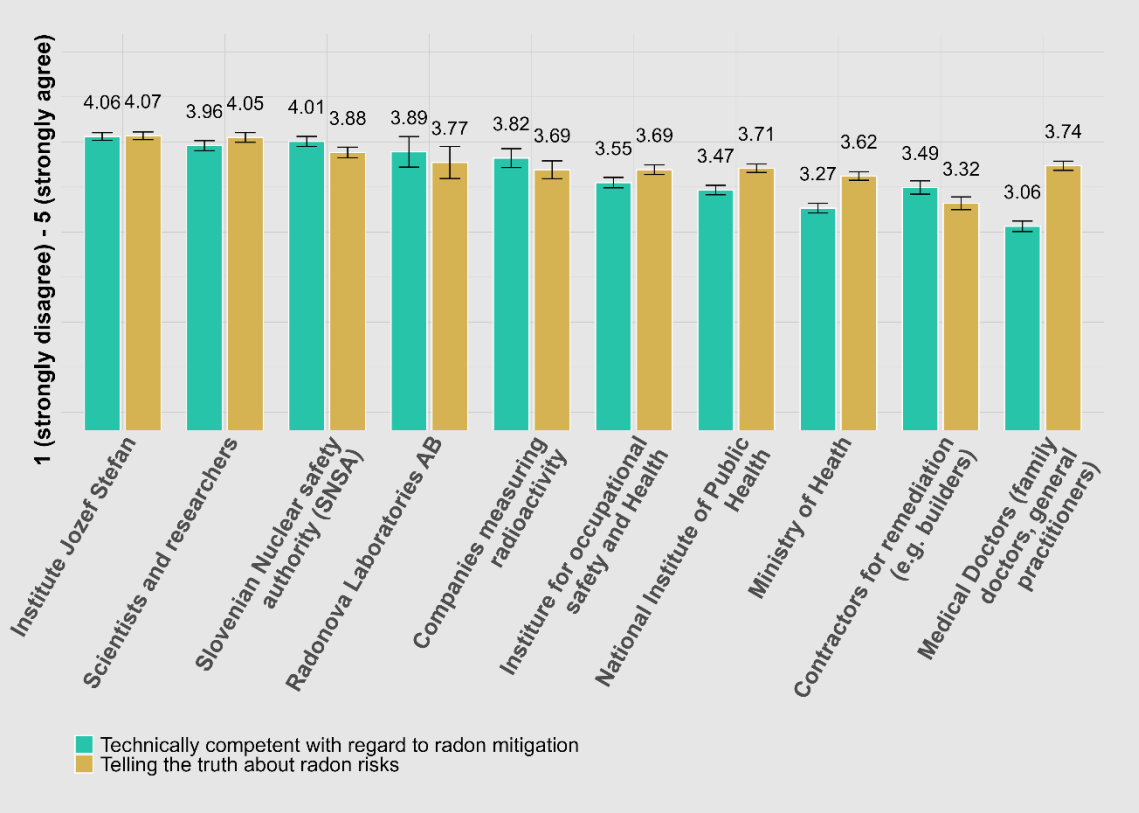


Figure 41: Trust in stakeholders to manage radon risk

The figure below depicts three concepts related to trust in radon risk management: stakeholder familiarity, truthfulness, and technical competence. The survey results show that the Institute Jozef Stefan is the most known, trustworthy, and competent stakeholder in radon risk management, as recognized by 79.8% of respondents. Health authorities are also well known, but not recognized as the most competent or trustworthy stakeholders. On the other hand, scientists from universities and the Slovenina Radiation Protection Administration are relatively well known, and their competences and trustworthiness are also recognized by the Slovenian population. The lowest level of trust, although not well known, is placed in contractors for remediation, such as builders and companies measuring radioactivity. These findings suggest that stakeholder familiarity, truthfulness, and technical competence are all crucial components in establishing trust in radon risk management stakeholders. The Institute Jozef Stefan emerges as the most trusted stakeholder in all three domains, indicating that it has successfully established a reputation as a reliable and competent authority in radon risk management. The findings also highlight the need for contractors and other technical stakeholders to improve their communication and establish themselves as trustworthy and technically competent actors in radon risk management.

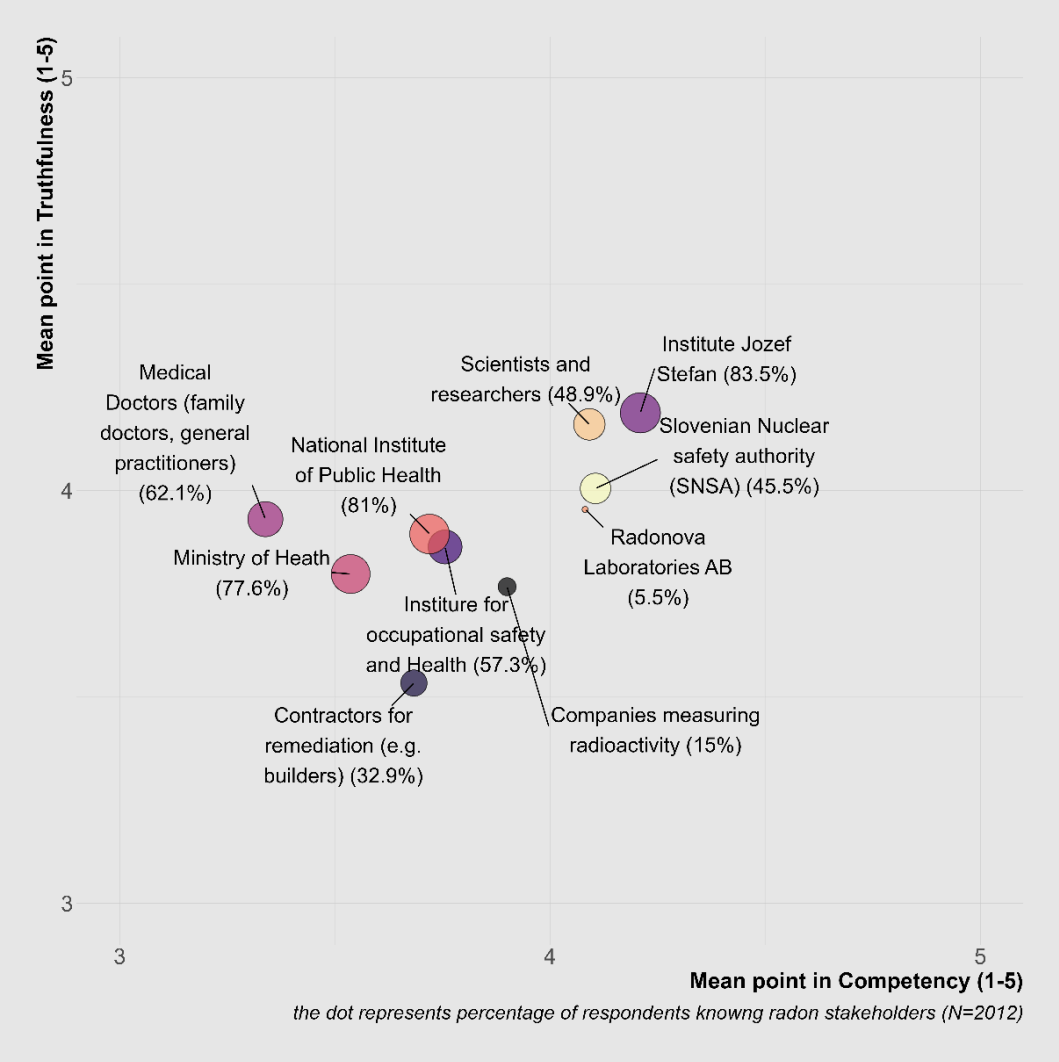


Figure 42: Trust in competency of stakeholders.

4.12 Severity

Severity

The severity of radon exposure is determined by people's beliefs regarding the seriousness of its negative consequences. The goal of our study was to measure how respondents perceive the severity of radon exposure for themselves and for others.

Our findings suggest that respondents view radon as a significant risk, with high levels of agreement that not taking action when there is a high radon concentration in their homes would pose a severe threat to their health. Interestingly, we found no significant differences in perceived severity between people living in different radon risk areas.

One particularly noteworthy result is related to the video. Participants who were exposed to the video, which had low or no knowledge of radon issues, had a significantly lower perception of severity compared to those who didn't see the video, who had a higher level of knowledge about radon issues.

We also found a significant positive correlation between the Severity scale factor scores and the Intention to Change Behavior factor scores. This means that respondents who perceived higher severity of negative consequences associated with radon exposure were more likely to report a stronger intention to test and mitigate radon levels. Specifically, the Pearson correlation coefficient was r = .295, indicating a moderately strong correlation, with a p-value of less than .001, which is highly statistically significant.

The severity of a radon exposure is determined by people's beliefs regarding the seriousness of its negative consequences. Our study aims to measure how respondents perceive the severity of radon exposure for themselves and for others.

In our questionnaire, we assessed the severity of the impact of radon on oneself using two items. The respondents were asked to rate their level of agreement with the following statements: "Not taking action when there is a high radon concentration in my house would pose a severe threat to my health" and "Not taking any action against high radon concentration in my house would be life-threatening for me." The agreement was measured on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

To evaluate the severity of radon exposure for others, we used two items in the survey: "If my neighbors have high radon concentrations and do not take remedial measures, their health would be at risk" and "If people in my community address the issue of radon, they can avoid serious health issues caused by radon exposure." The respondents were asked to rate their level of agreement with each statement on a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5).

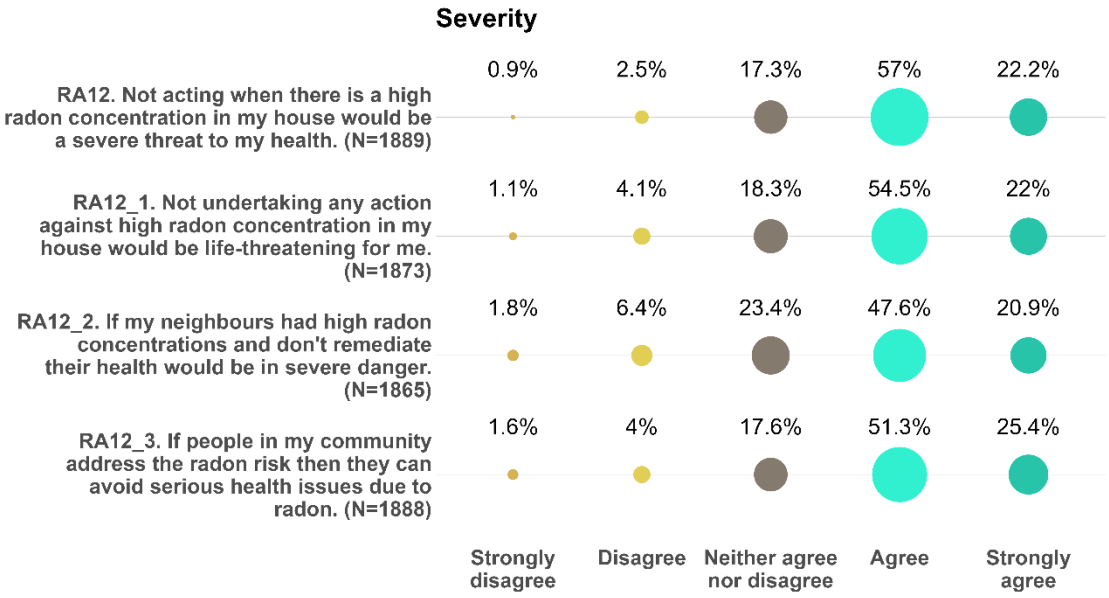


Figure 43: Overview of severity. (N = 2012), unweighted sample.

The findings suggest that respondents perceive radon as a significant risk. A vast majority, 79.2%, agreed or strongly agreed with the statement that not taking action when there is a high radon concentration in their house would pose a severe threat to their health, while 76.5% agreed or strongly agreed that it would be life-threatening. In addition, 68.5% of respondents agreed or strongly agreed that their neighbors' health would be at risk if they had high radon concentrations and did not take remedial measures. Moreover, 76.7% of respondents agreed or strongly agreed that people in their community could avoid serious health issues caused by radon exposure by addressing the problem.

An independent-samples t-test was conducted to examine whether there was a significant difference in Severity scale factor scores between the group who saw the radon video and the group who did not see the video. The results indicated a statistically significant difference between the two groups, $t(1809) = -6.875$, $p < .001$. The mean Severity scale factor score for the group who saw the video was $M = -.202$ ($SD = 1.09$), while the mean Severity scale factor score for the group who did not see the video was $M = .138$ ($SD = .991$). These findings suggest that exposure to the radon video was associated with respondents' beliefs about the severity of negative consequences associated with radon exposure. In other words, those who saw the video perceived radon as less severe than the other respondents. This may suggests that exposure to a video communication affected respondents' emotions regarding the dangerous nature of radon, or people with lower knowledge of radon have a lower perception of severity.

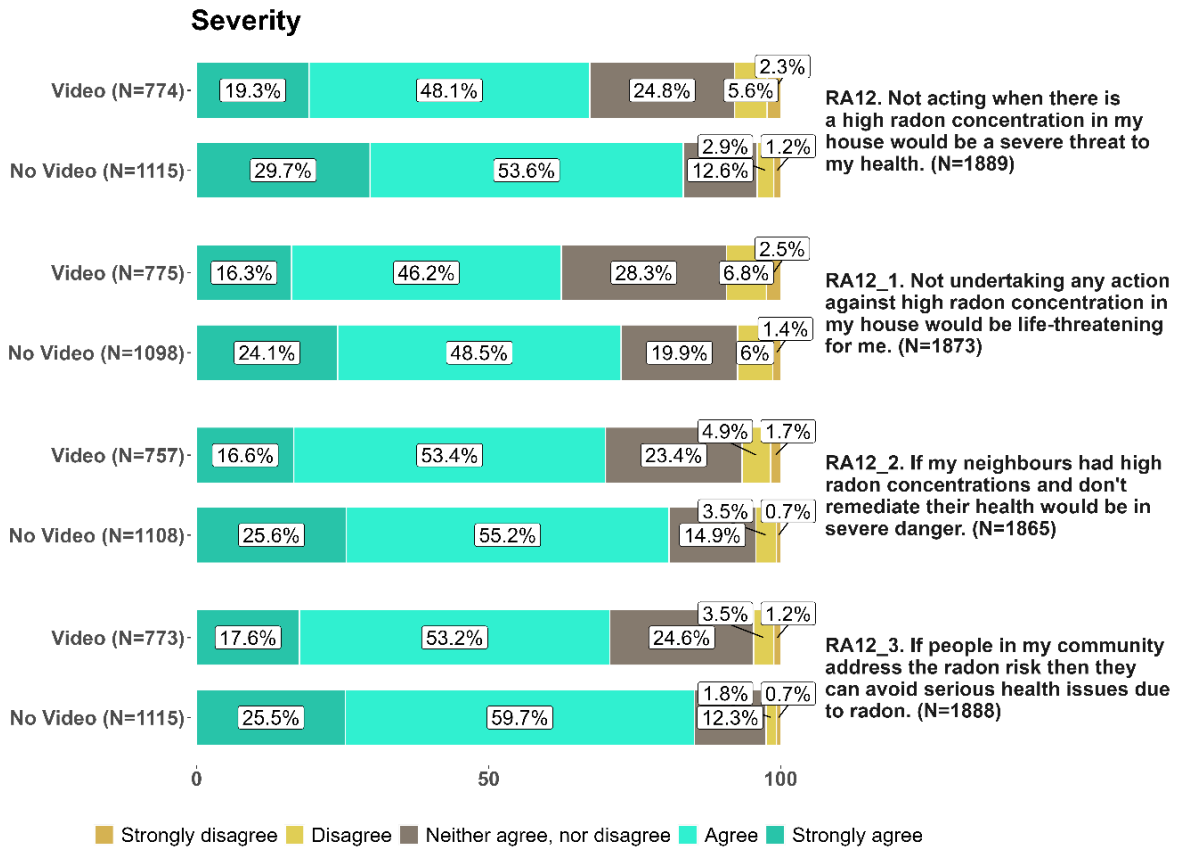


Figure 44: Overview of severity by exposure to video or no exposure to video. (N = 2012), unweighted sample.

An independent-samples t-test was conducted to investigate whether there was a significant difference in Severity scale factor scores between respondents living in high and medium radon risk areas compared to those living in low radon risk areas. The results revealed no statistically significant difference between the two groups.

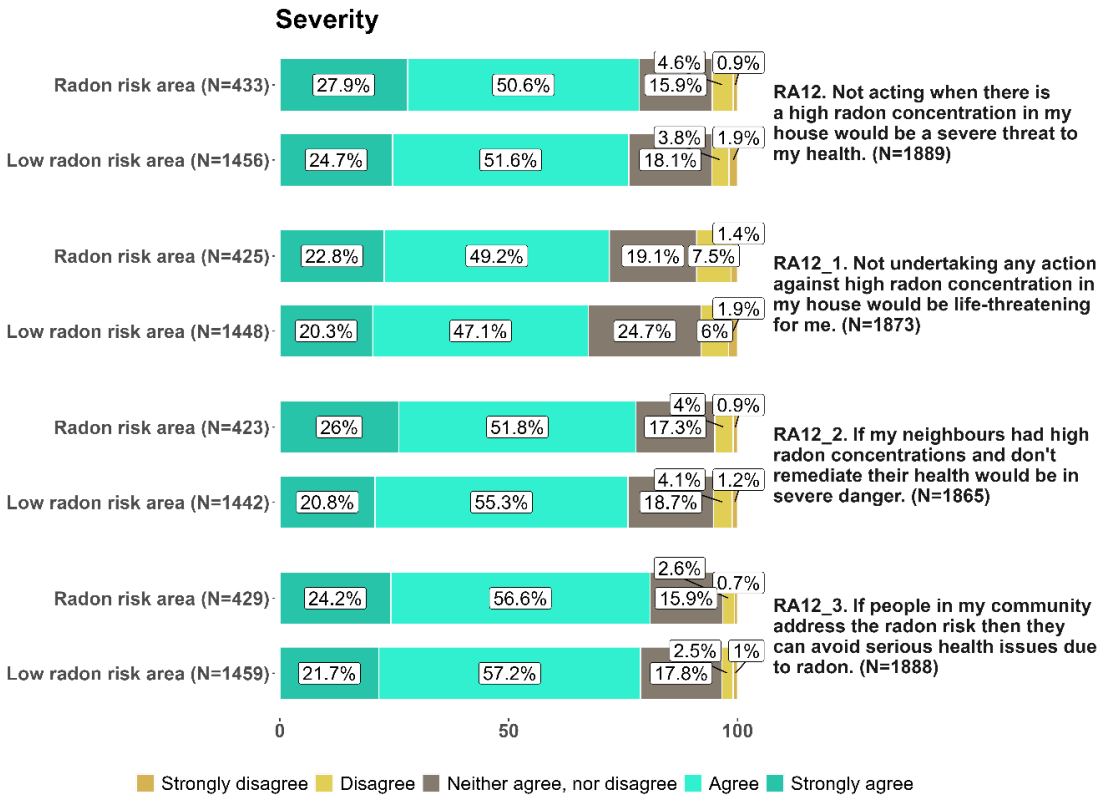


Figure 45: Overview of severity by radon risk area. (N = 2012), unweighted sample.

Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the severity scale. The analysis revealed a single factor, which accounted for 72% of the total variance (N=1812 out of 2012). All four items loaded significantly on the factor (range of factor loadings: .81 to .9), indicating that they shared a common underlying factor. The internal consistency of the scale was found to be high, with a Cronbach's alpha coefficient of .91, indicating good reliability.

Table 13: Minimum, maximum, means and standard deviation values concerning severity. (N = 2012), unweighted sample.

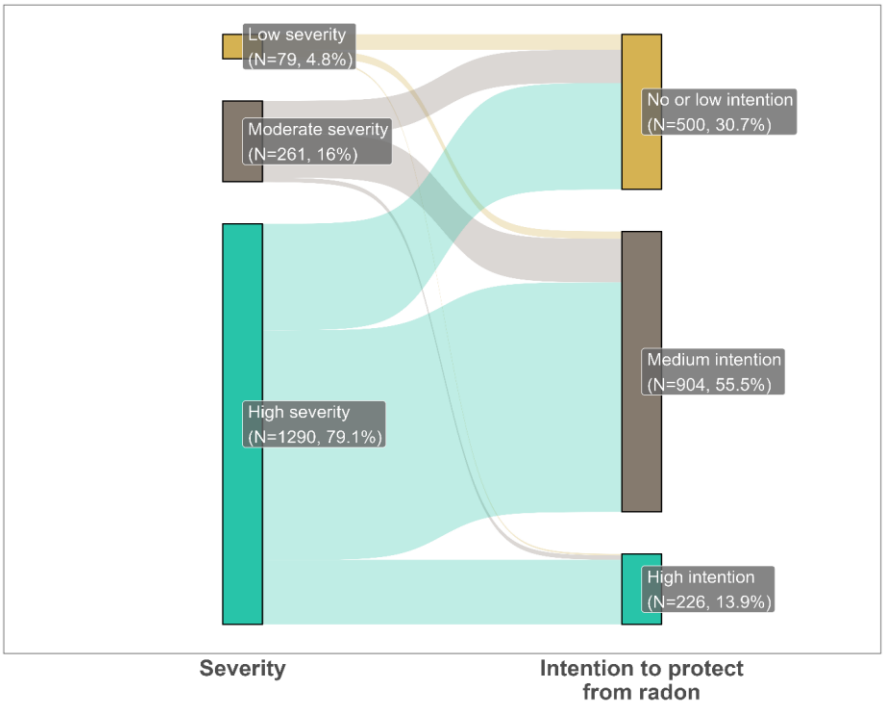
Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA12 Not acting when there is a high radon concentration in my house would be a severe threat to my health.	1889	1	5	3.95	.857
RA12_1 Not undertaking any action against high radon concentration in my house would be life-threatening for me.	1873	1	5	3.79	.904
RA12_2 If my neighbours had high radon concentrations and don't remediate their health would be in severe danger.	1865	1	5	3.92	.813
RA12_3 If people in my community address the radon risk then they can avoid serious health issues due to radon.	1888	1	5	3.97	.759

Table 14: Principal axis factoring, factor loadings for severity, RA12, RA12_1, RA12_2, RA12_3, Unweighted sample.

Severity scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA12 Not acting when there is a high radon concentration in my house would be a severe threat to my health.	.814	.872	.908 N = 1812 (90.1%)	.911 N = 411 (90.7%)
RA12_1 Not undertaking any action against high radon concentration in my house would be life-threatening for me.	.845	.824		
RA12_2 If my neighbours had high radon concentrations and don't remediate their health would be in severe danger.	.896	.897		
RA12_3 If people in my community address the radon risk, then they can avoid serious health issues due to radon.	.830	.810		

To explore the relationship between respondents' beliefs about the seriousness of negative consequences associated with radon exposure and their intention to take action, a Pearson correlation coefficient was computed. Specifically, the correlation coefficient was calculated between the Severity scale factor scores (with high scores indicating a perceived high severity of radon) and the Intention to Change Behavior factor scores (with high scores indicating a strong intention to test and mitigate radon levels). The sample size for this analysis was N = 1550 since people responding “I don’t know” on minimum one item were excluded from the anlysis.

The results indicated a statistically significant positive correlation between the Severity scale factor scores and the Intention to Behavior Change High factor scores, $r = .295$, $p < .001$. This suggests that respondents who perceived a higher severity of negative consequences associated with radon exposure were also more likely to report a stronger intention to test and mitigate radon levels.



N=1630
321 mising values in Intention to protect from radon

Figure 46: Severity scale factor scores and intention to protect from radon.

4.13 Susceptibility

Susceptibility

Perceived susceptibility is an individual's belief about the likelihood of acquiring a disease or experiencing negative health consequences as a result of taking or not taking action to remediate a potential hazard. In the context of radon exposure, perceived susceptibility can be divided into susceptibility for yourself and susceptibility for others. This study revealed that more than half of respondents believed they could develop lung cancer due to radon if they did not address high concentrations in their homes. A majority of respondents also believed that their neighbors would fall ill if they did not remediate high radon concentrations in their homes. Interestingly, 51% of respondents found it unlikely that they would become ill if they did not remediate high radon concentrations.

The level of susceptibility related to radon exposure is not different in different radon risk areas. Hovewer, exposure to radon-related information in the form of a video or having low knowledge about radon may lead to a lower perception of susceptibility to radon exposure.

Perceived susceptibility refers to an individual's subjective belief about the likelihood of developing a disease or experiencing negative health consequences as a result of (not) taking action to remediate a potential hazard. In the context of radon exposure, perceived susceptibility can be further divided into two components: susceptibility for yourself and susceptibility for others. Susceptibility of yourself refers to an individual's perception of how likely it is that they will experience negative health consequences due to radon exposure. Susceptibility of others, on the other hand, refers to an individual's perception of how likely it is that others, such as family members or neighbors, will experience negative health consequences due to radon exposure.

Participants were asked to rate their level of agreement on the following four statements related to susceptibility: “believe that I can develop lung cancer due to radon if I don't tackle high concentration in my home. “; “How likely do you think it is that you will get sick if you don't remediate high radon concentrations?”; “I will remain healthy although I don’t remediate high radon concentrations in my home.”; “How likely do you think people in your neighbourhood will get sick if they don't remediate high radon concentrations?” All items were rated on a 5-point Likert scale, ranging from 1 (very unlikely) to 5 (very likely).

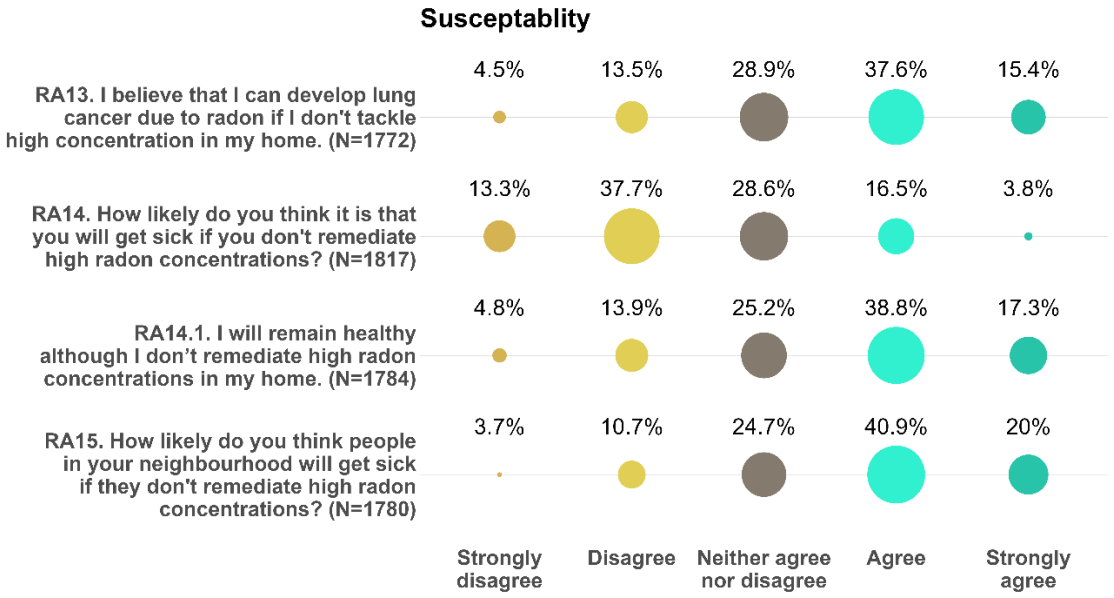


Figure 47: Overview of susceptibility. (N = 2012), unweighted sample.

The results of our study revealed that more than half of the respondents, 53%, agreed or strongly agreed with the statement "I believe that I can develop lung cancer due to radon if I do not address high concentrations in my home". Additionally, a majority of respondents, 60.9%, agreed or strongly agreed that their neighbors would fall ill if they did not remediate high radon concentrations in their homes. Interestingly, 51% of the respondents found it unlikely that they would become ill if they did not remediate high radon concentrations.

To investigate whether there was a difference in perceived susceptibility between those who were exposed to the radon video (low or no knowledge about radon) and those who were not exposed to the video (higher knowledge about radon), an independent-samples t-test was conducted. The video group consisted of 672 respondents with a mean susceptibility score of -.2 (SD = .96), while the no video group included 1000 respondents with a mean susceptibility score of .13 (SD = .93). Levene's test for equality of variances was conducted and the result showed $F = 3.69$, with a p-value of .055. The independent-samples t-test revealed a statistically significant difference between the two groups, $t(1671) = -7.100$, $p < .001$, with the no video group reporting a higher perceived susceptibility to radon exposure. This finding potentially suggests that exposure to radon related information in the form of video or have low or no knowledge about radon may lead to a lower perception of susceptibility to radon exposure. It could also be that people with lower knowledge just have lower susceptibility perceptions and that the one-shot video did not help to change that. More research is needed to explain the relationship between susceptibility, knowledge and communication intervention.

Susceptibility - per video

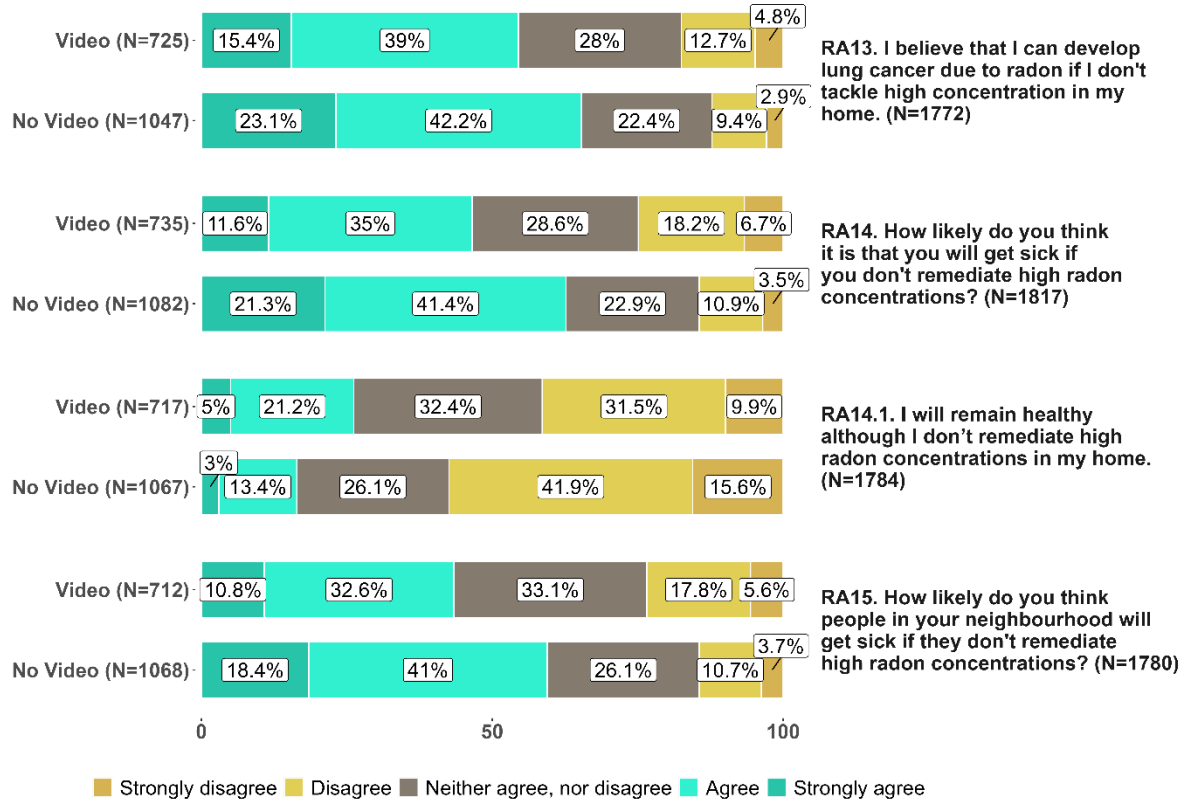


Figure 48: Overview of susceptibility by exposure to video or no exposure to video. (N = 2012), unweighted sample.

An independent-samples t-test was conducted to investigate whether there was a significant difference in Susceptibility scale factor scores between respondents living in high and medium radon risk areas compared to those living in low radon risk areas. The results revealed no statistically significant difference between the two groups.

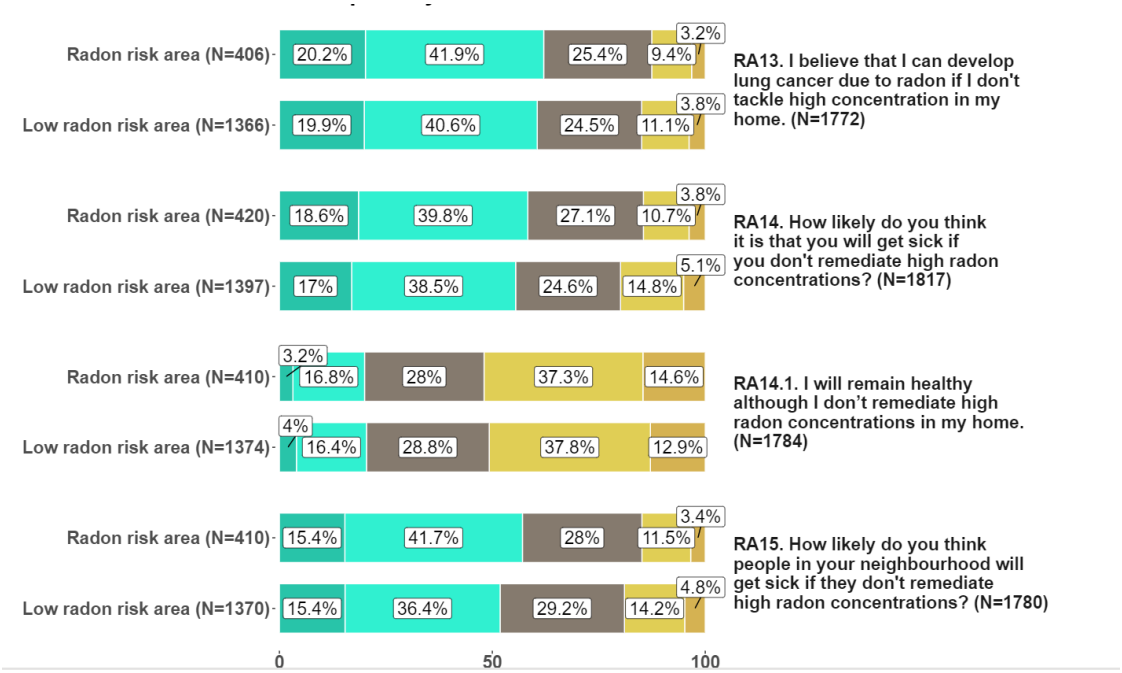


Figure 49: Overview of susceptibility by radon risk area. (N = 2012), unweighted sample.

The **Susceptibility scale** was assessed using a four-item questionnaire. Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the susceptibility scale. The analysis revealed a single factor, which accounted for 57% of the total variance (N=1674 out of 2012). All four items loaded significantly on the factor (range of factor loadings: .462 to .932), indicating that they shared a common underlying factor. The internal consistency of the scale was found to be high, with a Cronbach's alpha coefficient of .426, indicating good reliability.

Table 15: Minimum, maximum, means and standard deviation values concerning severity. (N = 2012), unweighted sample.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA13 I believe that I can develop lung cancer due to radon if I don't tackle high concentration in my home.	1772	1	5	3.63	1.034
RA14 How likely do you think it is that you will get sick if you don't remediate high radon concentrations?	1817	1	5	3.50	1.078
RA14_1 I will remain healthy although I don't remediate high radon concentrations in my home	1784	1	5	2.60	1.032
RA15 How likely do you think people in your neighbourhood will get sick if they don't remediate high radon concentrations?	1780	1	5	3.46	1.047

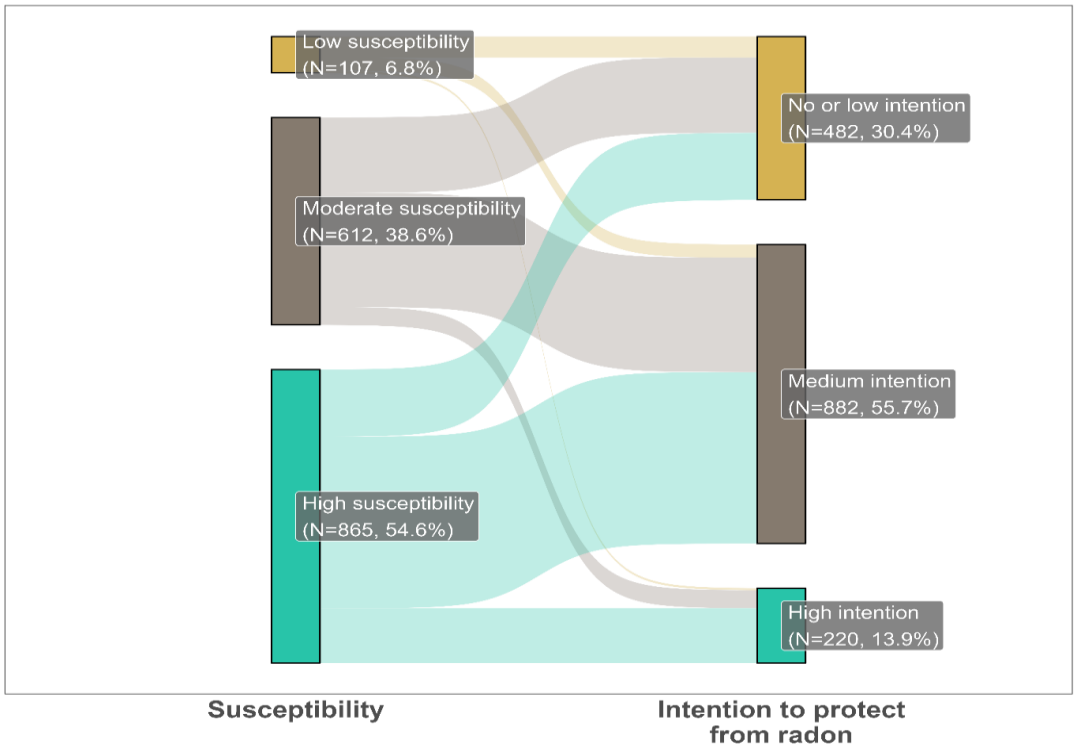
Table 16: Principal axis factoring, factor loadings for susceptibility, RA13, RA14, RA14_1, RA15, Unweighted sample.

Susceptibility scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA13 I believe that I can develop lung cancer due to radon if I don't tackle high concentration in my home.	.847	.852		
RA14 How likely do you think it is that you will get sick if you don't remediate high radon concentrations?	.932	.882	.426 N = 1674 (83.2%)	.850 N = 387 (85.4%)
RA14_1 I will remain healthy although I don't remediate high radon concentrations in my home	-.462	Excluded	57%	66%
RA15 How likely do you think people in your neighbourhood will get sick if they don't remediate high radon concentrations?	.700	.697		

To investigate the relationship between respondents' perceived susceptibility towards radon exposure and their intention to change behavior, we conducted a Pearson correlation analysis. Perceived susceptibility refers to an individual's belief in the likelihood of acquiring a disease or experiencing negative health consequences as a result of (not) taking action to remediate a dwelling for radon. The Intention to Change Behavior factor scores indicate the level of motivation respondents had, to test and mitigate radon levels in their homes.

Our results showed that there was a significant positive correlation ($r = .346$, $p < .001$) between perceived susceptibility and the Intention to Behavior Change factor scores. This suggests that respondents who perceived themselves or others to be susceptible to negative health consequences from radon exposure were more likely to express a strong intention to test and mitigate radon levels in their homes.

Overall, these findings highlight the importance of addressing perceived susceptibility when promoting behavior change for radon remediation. By increasing awareness of the potential health risks associated with radon exposure and highlighting the susceptibility of individuals and their communities, efforts to promote behavior change may be more effective in encouraging the adoption of radon mitigation strategies.



N=1584
321 mising values in Intention to protect from radon

Figure 50: Susceptibility ans intention to protect from radon.

4.14 Response efficacy: remediaiton

Response efficacy: remediation

An individual is more likely to intend to perform a behavior, such as testing or mitigating for radon, only if they are convinced that it will lead to the desired outcome. Coping appraisal plays a crucial role in adopting or maintaining a health protection behavior and helps overcome fears and mental blocks. This part of the research focuses on the importance of coping appraisal, which comprises response efficacy, response costs, and self-efficacy, in promoting and maintaining health protection behaviours, specifically radon testing and mitigation. While most respondents agreed or strongly agreed that home remediation and special installations offer effective protection against radon hazards, some respondents expressed disagreement and uncertainty regarding the ability of special installations to reduce radon levels to a safe level. A test conducted to compare response efficacy scores between participants who watched a video and those who did not watch a video did not show any significant statistical differences. This suggests that exposure to a video, may not have a significant impact on an individual's perception of the effectiveness of recommended behviours. Another test was conducted to compare response efficacy scores between participants from high and medium risk areas and those from low radon risk areas, and the results were not statistically significant. Finally, a correlation analysis was conducted to examine the relationship between response efficacy scores and participants' intention to test and mitigate radon exposure, and the results showed a positive but relatively weak relationship. Participants who perceived the recommended behaviours as more effective were more likely to express an intention to test and mitigate radon exposure. These findings highlight the importance of promoting accurate and effective information about radon exposure and mitigation to improve individuals' perception of the effectiveness of recommended behviours and increase their intention to take action to protect themselves and others from the harmful effects of radon exposure.

An individual is more likely to intend to perform a behavior, such as testing or mitigating for radon, only if they are convinced that it will lead to the desired outcome. Coping appraisal plays a crucial role in adopting or maintaining a health protection behavior and helps overcome fears and mental blocks. Coping appraisal comprises three elements: response efficacy, response costs, and self-efficacy.

Response efficacy refers to an individual's belief that the recommended behavior will effectively protect them from the negative health consequences of radon exposure. Response costs relate to the perceived negative aspects of adopting a particular behavior, such as the cost and inconvenience of radon mitigation. Self-efficacy is the belief in one's ability to successfully perform the recommended behavior, such as the ability to conduct a radon test or install a mitigation system.

Overall, incorporating coping appraisal elements, such as response efficacy, response costs, and self-efficacy, can be helpful in promoting and maintaining health protection behviours, such as radon testing and mitigation.

Participants were asked to rate their level of agreement on the following five statements: “Home remediation, if needed, offers effective protection against radon hazards.”; “Home remediation, if needed, will fail to protect from high radon concentrations.”; “A special installation would eliminate the radon hazard if needed.”; “A special installation can NOT reduce radon to a safe level in homes that have a radon problem.”; “I am confident that I would be able to test the indoor radon concentrations in my home if I wanted to.” All items were rated on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

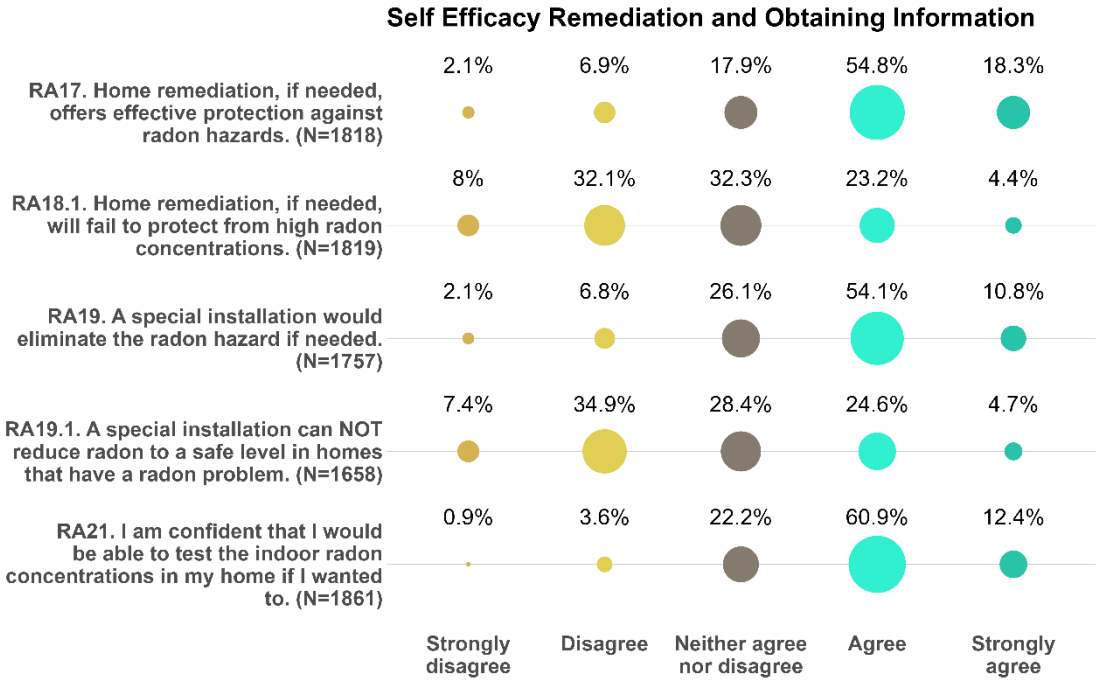


Figure 51: Overview of respondent's self-efficacy remediation. (N = 2012), unweighted sample.

In response to the statement, "Home remediation, if needed, offers effective protection against radon hazards," 73.1% of respondents agreed or strongly agreed. Conversely, with the statement "Home remediation, if needed, will fail to protect from high radon concentrations," 32.3% of respondents neither agreed nor disagreed, and 32.1% of respondents disagreed.

The statement "A special installation would eliminate the radon hazard if needed" was agreed upon by 72% of respondents. Similarly, the statement "I am confident that I would be able to test the indoor radon concentrations in my home if I wanted to" was also agreed upon by 72% of respondents.

Furthermore, the statement "A special installation cannot reduce radon to a safe level in homes that have a radon problem" received disagreement from 42.3% of respondents, and 28% of respondents neither agreed nor disagreed with this statement.

Overall, these findings suggest that there is a significant level of agreement among respondents regarding the effectiveness of home remediation and special installations in protecting against radon hazards. However, there is also some disagreement and uncertainty regarding the ability of special installations to reduce radon levels to a safe level.

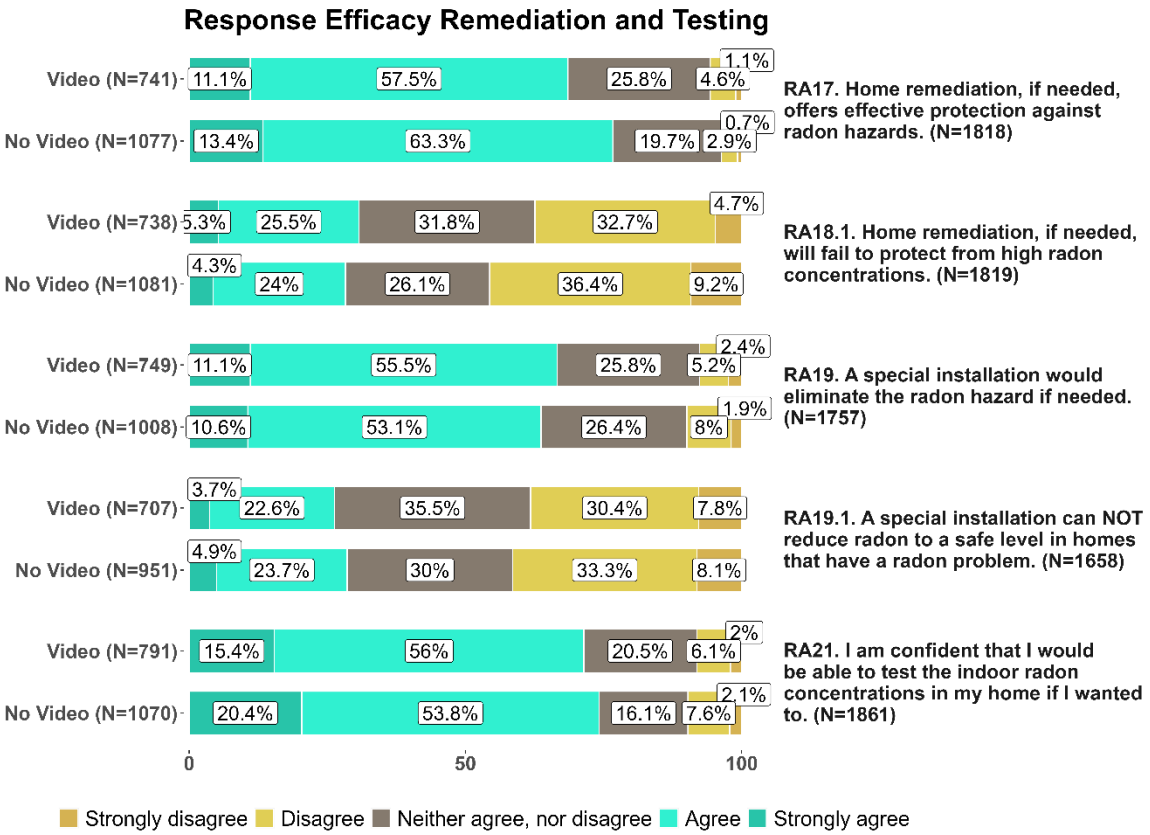


Figure 52: Overview of response efficacy remediation and testing by exposure to video or no exposure to video. (N = 2012), unweighted sample.

The test conducted to compare response efficacy scores, which were calculated as the sum of all relevant items, between the groups who watched a video and those who did not watch a video did not yield any significant statistical differences. In other words, the results indicate that the video did not have a significant impact on participants' response efficacy scores.

This suggests that exposure to a video on radon exposure may not have a significant impact on an individual's perception of the effectiveness of recommended behaviours for protecting against radon exposure, or that radon knowledge has little impact on beliefs regarding effectiveness of measures.

Another test was conducted to compare the response efficacy scores between respondents from high and medium risk areas and those from low radon risk areas. The results of this test were also not statistically significant. This suggests that there was no significant difference in the perception of efficacy for recommended behaviours for protecting against radon exposure between respondents from different risk areas.

These findings may indicate that individuals' perception of response efficacy is not strongly influenced by their level of radon exposure risk.

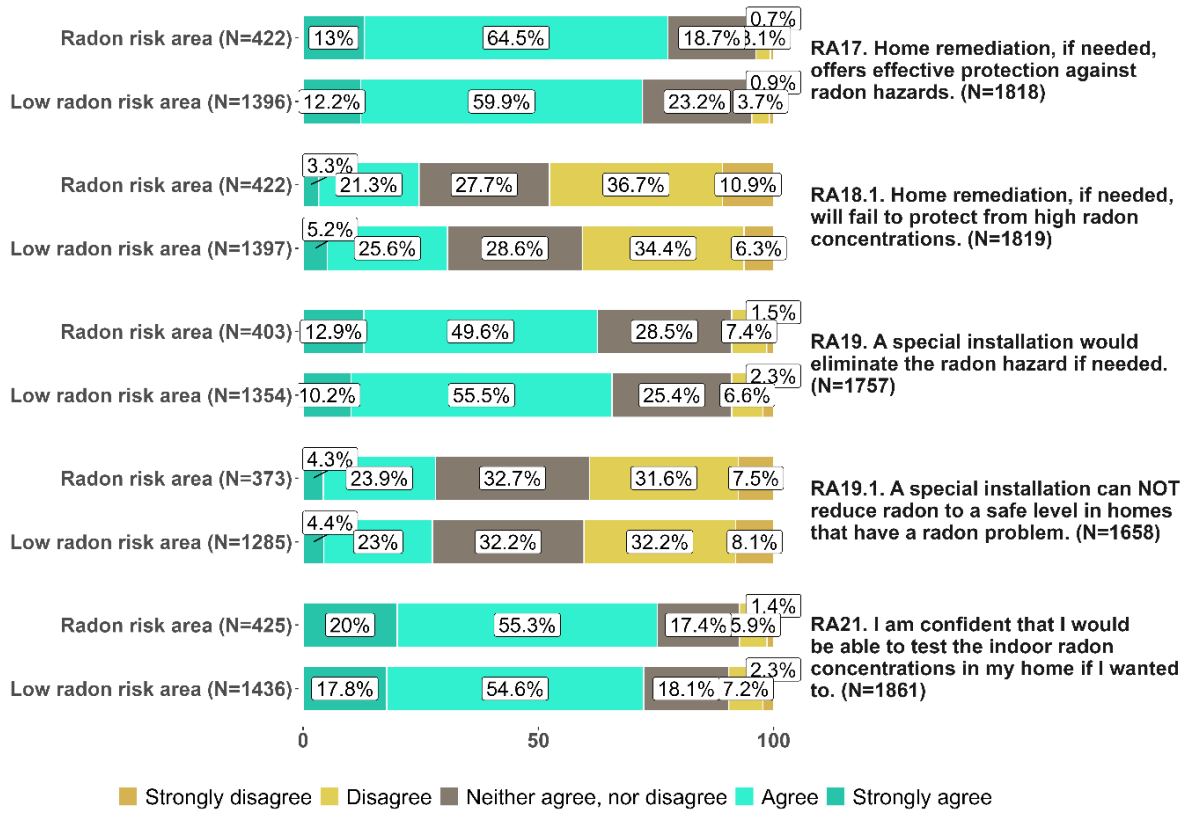


Figure 53: Overview of response efficacy remediation and testing by radon risk area. (N = 2012), unweighted sample

The **Response efficacy remediation scale** was assessed using a five-item questionnaire. Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the response efficacy remediation scale. However; this analysis revealed no common factors with a good total variance or items that loaded significantly. Therefore, a correlation table was constructed. This showed that there is a low correlation between the different variables presented (correlation ranging from .01 to .5). For this reason, running a factor analysis is not in place. This indicate that the items related to response efficacy are not reflecting but rather formative. Formative scales measure constructs that are assumed to be created by the measures used to assess them. In other words, the items in a formative scale define the construct being measured, and the construct is seen as the outcome of the observed relationships between items.

Table 17: Minimum, maximum, means and standard deviation values concerning response efficacy remediation. (N = 2012), unweighted sample.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA17 Home remediation, if needed, offers effective protection against radon hazards.	1818	1	5	3.80	.728
RA18_1 Home remediation, if needed, will fail to protect from high radon concentrations.	1819	1	5	2.84	1.027
RA19 A special installation would eliminate the radon hazard if needed.	1757	1	5	3.65	.841
RA19_1 A special installation can NOT reduce radon to a safe level in homes that have a 1radon problem.	1658	1	5	2.84	1.011
RA21 I am confident that I would be able to test the indoor radon concentrations in my home if I wanted to.	1861	1	5	3.80	.888

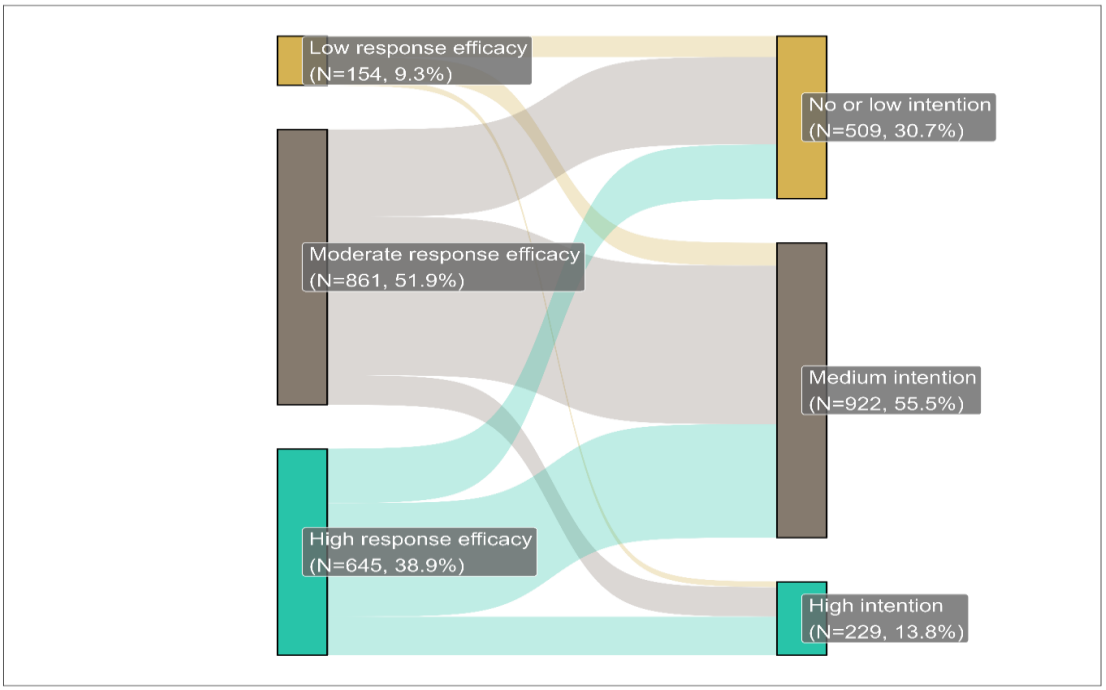
Table 18:Correlation between response efficacy items, RA17, RA18_1, RA19, RA19_1, RA21, Unweighted sample.

Response efficacy items	RA17 Home remediation, if needed, offers effective protection against radon hazards.	RA18_1 Home remediation, if needed, will fail to protect from high radon concentrations.	RA19 A special installation would eliminate the radon hazard if needed.	RA19_1 A special installation can NOT reduce radon to a safe level in homes that have a radon problem.
RA17 Home remediation, if needed, offers effective protection against radon hazards.	1			
RA18_1 Home remediation, if needed, will fail to protect from high radon concentrations.	-.080 P=<.001	1		
RA19 A special installation would eliminate the radon hazard if needed.	.497 P=<.001	.045 p=.037	1	
RA19_1 A special installation can NOT reduce radon to a safe level in homes that have a radon problem.	-.079 P=<.001	.322 p=.000	-.161 p=.000	1
RA21 I am confident that I would be able to test the indoor radon concentrations in my home if I wanted to.	.284 p=.001	.008 p=.381	.231 p=.000	-.064 p=.006

A correlation analysis was conducted to examine the relationship between response efficacy scores and participants' intention to test and mitigate radon exposure. The response efficacy scores were calculated as the sum of all relevant items from the survey questionnaire. The analysis was conducted on a sample size of 1395 participants, and the results showed a statistically significant correlation (p=.000) between the two variables, with a Pearson correlation coefficient of .113.

This indicates that there is a positive but relatively weak relationship between participants' perception of the effectiveness of recommended behaviours for protecting against radon exposure (as measured by response efficacy scores) and their intention to test and mitigate radon exposure. In other words, participants who perceived the recommended behaviours as more effective were more likely to express an intention to test and mitigate radon exposure.

While the correlation coefficient of .113 indicates a relatively weak relationship, the statistically significant p-value suggests that this relationship is unlikely to be due to chance alone. These findings highlight the importance of promoting accurate and effective information about radon exposure and mitigation to improve individuals' perception of the effectiveness of recommended behviours and increase their intention to take action to protect themselves and others from the harmful effects of radon exposure.



N=1660
321 mising values in Intention to protect from radon

Figure 54: Responses efficacy and intention to protect from radon.

4.15 Self-efficacy

Self-efficacy

Self-efficacy refers to the belief in one's own competence to perform a behaviour even in the face of barriers or in other words, the individual in carrying out the recommended coping response. The results indicate that over 75% of individuals lack confidence in their ability to effectively remediate their homes if they wished to do so. However, more than 63% express confidence in their capacity to hire a contractor to reduce indoor radon levels if they desired. Additionally, over 30% of respondents lack confidence in their ability to find the necessary information to protect themselves in the event of high radon levels in their homes. Around 33% remain neutral on the matter, while nearly 35% feel confident in their ability to access the required information to safeguard themselves against radon exposure. There is no notable variance in self-efficacy levels between individuals residing in high radon risk zones and those in low radon risk areas.

Self-efficacy refers to the belief in one's own competence to perform a behaviour even in the face of barriers or in other words, the individual in carrying out the recommended coping response.
The self efficacy was assessed using a three-items. Participants were asked to rate their level of agreement on the following three statements: "I am NOT confident that I will be able to effectively remediate my home if I wanted to."; "I am confident I would be able to hire a contractor to decrease the

indoor radon concentration if I wanted to."; "I am confident that in the case of high levels of radon in my home, I will find the information needed to protect myself." All items were rated on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

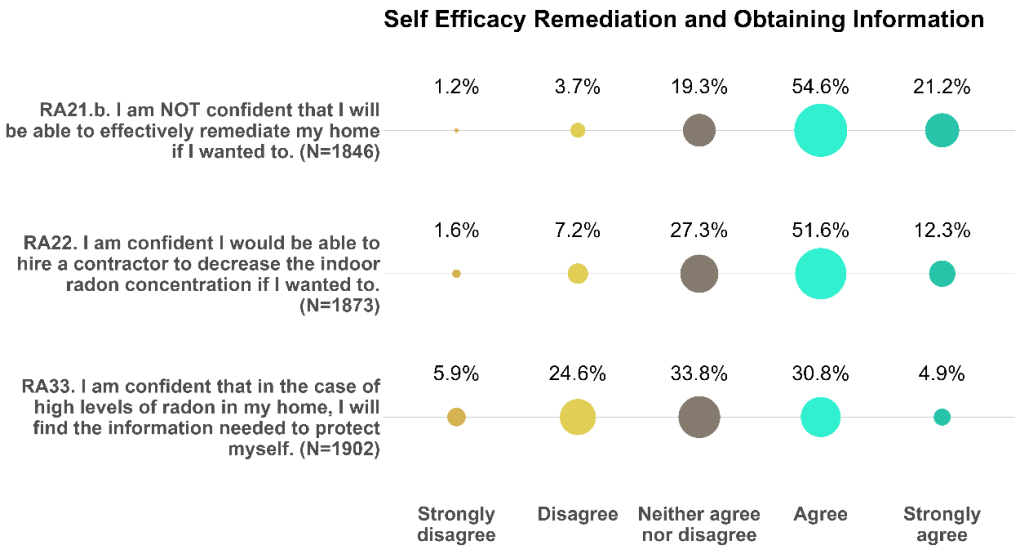


Figure 55: Overview of respondent's self-efficacy. (N = 2012), unweighted sample.

The results indicate that over 75% of individuals lack confidence in their ability to effectively remediate their homes if they wished to do so. However, more than 63% express confidence in their capacity to hire a contractor to reduce indoor radon levels if they desired. Additionally, over 30% of respondents lack confidence in their ability to find the necessary information to protect themselves in the event of high radon levels in their homes. Around 33% remain neutral on the matter, while nearly 35% feel confident in their ability to access the required information to safeguard themselves against radon exposure.

Table 19: Minimum, maximum, means and standard deviation values concerning self-efficacy. (N = 2012), unweighted sample.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA21_b I am NOT confident that I will be able to effectively remediate my home if I wanted to.	1846	1	5	3.04	.992
RA22 I am confident I would be able to hire a contractor to decrease the indoor radon concentration if I wanted to.	1873	1	5	3.66	.843
RA33 I am confident that in the case of high levels of radon in my home, I will find the information needed to protect myself.	1902	1	5	3.91	.807

Interestingly, video related to radon, testing an remediating didn't have any significant effect on self-efficacy. Self efficacy was also statistically simmilar in diferent radon risk areas.

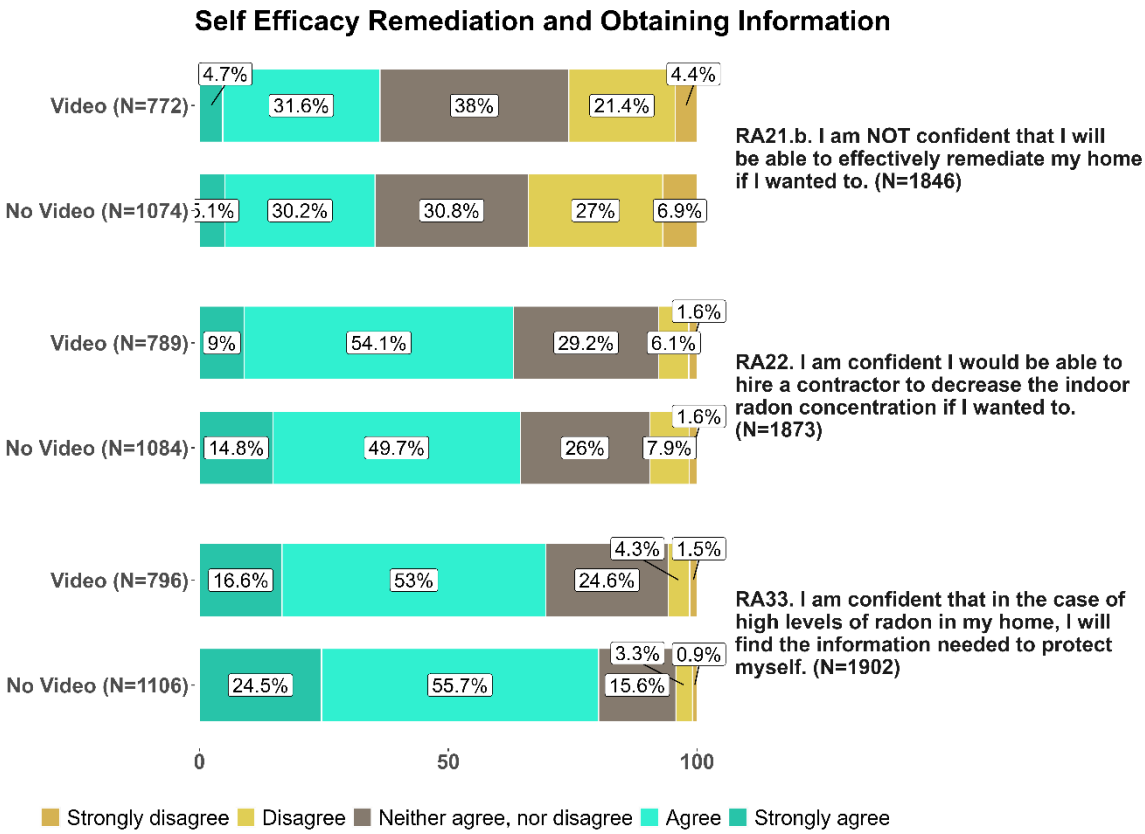


Figure 56: Overview of self-efficacy remediation and obtaining information by exposure to video or no exposure to video. (N = 2012), unweighted sample.

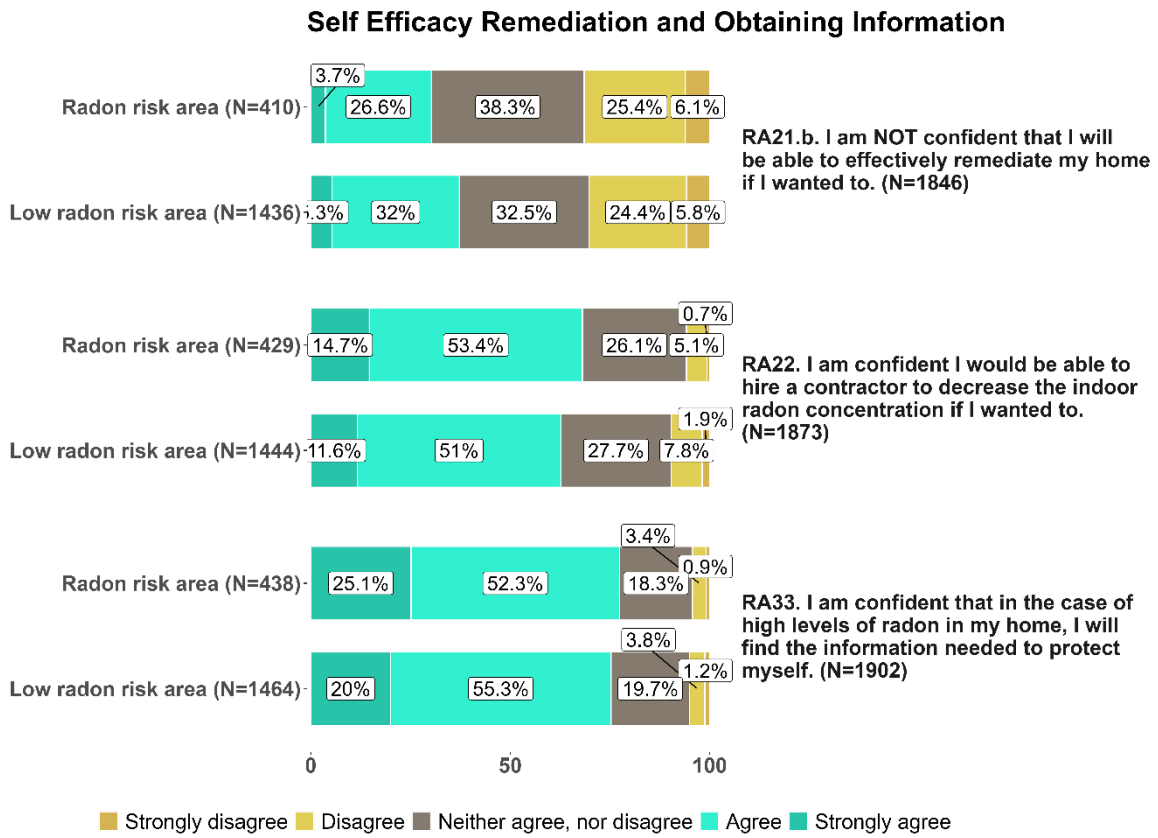


Figure 57: Overview of response efficacy remediation and obtaining information by radon risk area. (N = 2012), unweighted sample

In order to identify, whether the three items measure “Self efficacy” construct, principal axis factoring (no rotation) was performed to explore the underlying factor structure of the self-efficacy scale. The factor analysis with principal axis factoring showed a single factor solution. However, only two items out of three loaded significantly on the factor. Therefore, question RA21_b was excluded, which resulted to explaining 53% of the total variance (factor loadings: .727). Internal consistency of the scale was also found to be high in this population, with a Cronbach's alpha coefficient of .693, indicating good reliability. The factorial validity of the Intention to protect from radon scale was further confirmed in a sample of individuals living in medium or high radon risk area (N=453). Similar to the original sample, the factor analysis with principal axis factoring showed a single factor solution, with only two items that loaded significant on the factor. Therefore, question RA21_b was also excluded here. The explained total variance accounted for 51% (factor loading: .712). Internal consistency of the scale was also found to be high in this population, with a Cronbach's alpha coefficient of .673, indicating good reliability.

Table 20: Principal axis factoring, factor loadings for self-efficacy, RA21_b, RA22, RA33, Unweighted sample.

Self-efficacy scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA21_b I am NOT confident that I will be able to effectively remediate my home if I wanted to.	excluded	excluded		
RA22 I am confident I would be able to hire a contractor to decrease the indoor radon concentration if I wanted to.	.727	.712	.693 N=1845 (91.7%)	673 N=425 (93.8%)
RA33 I am confident that in the case of high levels of radon in my home, I will find the information needed to protect myself.	.727	.712	53%	51%

4.16 Perceived behavioural control: financial and other burdon and ease

Perceived behavioural control: financial and other burdon and ease

Perceived behavioral control encompasses the evaluation of financial resources and the ease associated with radon testing and remediation, as well as the burden these measures impose on individuals. These factors are crucial in determining a person's self-efficacy. It is important to note that perceived behavioral control, burden, and ease are measured separately and do not represent a single underlying construct.

The findings reveal that approximately 48% of respondents feel confident in their ability to afford a radon test costing 50 euros, while 36.6% remain neutral, and 15.4% stated that they cannot afford it. Similarly, over 48% of people in Slovenia indicated their capacity to afford 1000 euros for radon remediation, with 22% expressing neutrality and 14.6% unable to cover the cost.

In terms of financial burden, 48.8% of respondents agree or strongly agree that reducing radon in their homes would require more resources than they possess, while 35.5% disagree or strongly disagree with this statement. Overall, 65.6% of respondents believe that remediating their dwellings to reduce radon would be burdensome. Additionally, a significant majority (72.9%) perceive the procedure for remediating their homes due to radon as difficult. However, 58.6% believe that testing their dwellings for radon is relatively easy. The findings indicate that individuals who lack confidence in their ability to procure 50 euros for radon testing tend to exhibit minimal or low intentions to take protective measures against radon exposure

No statistical differences were observed in terms of perceived behavioral control, burden, and ease between areas with high radon risk and areas with low radon risk.

Perceived behavioral control encompasses the evaluation of financial resources and the ease associated with radon testing and remediation, as well as the burden these measures impose on

individuals. These factors are crucial in determining a person's self-efficacy. It is important to note that perceived behavioral control, burden, and ease are measured separately and do not represent a single underlying construct.

Financial burden was evaluated through two items concerning the costs involved. Participants were asked to rate their level of agreement with the following statements on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree): "I am confident that I could obtain 50 euros to test for radon if needed" and "I am confident that I could obtain 1000 euros to remediate for radon if needed."

The burden in general was assessed by participants' agreement levels with the following two statements on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree): "I believe reducing radon in my home would require more resources than I have" and "I believe reducing radon would be burdensome for me."

Perceived ease was measured using two items. Participants were asked to rate their level of agreement with the following statements on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree): "I believe the procedure for radon testing my home is easy" and "I believe the procedure for remediating my home due to radon is difficult."

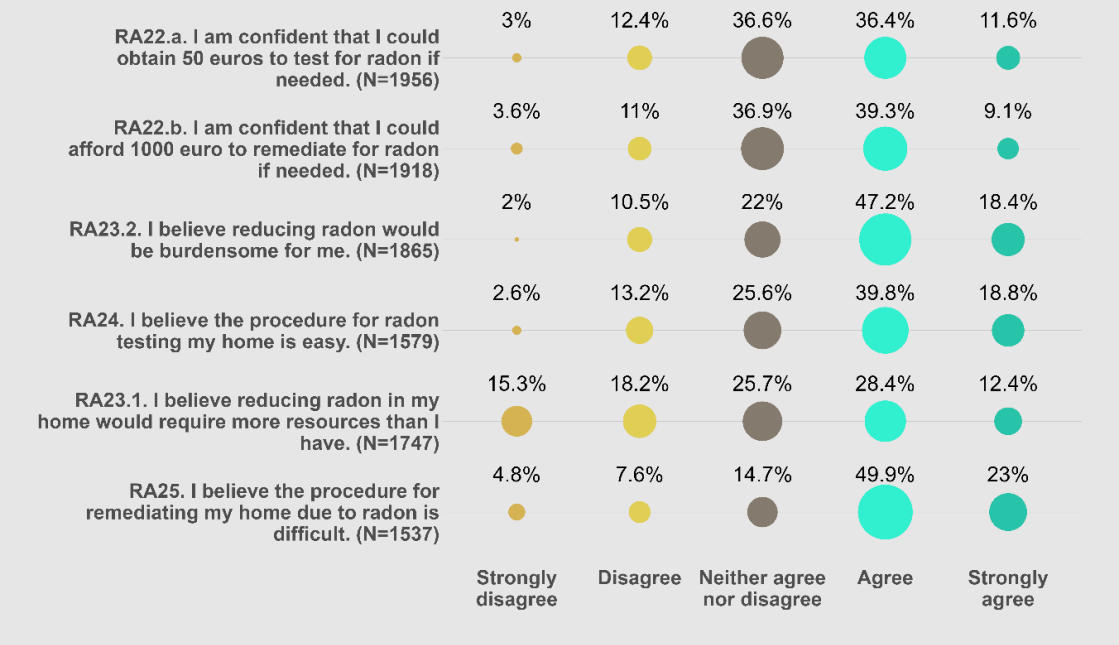


Figure 58: Overview of responses related to financial and other burdon and ease (N = 2012)

Regarding the financial burden, the results indicate that 48% of the respondents are confident in their ability to obtain 50 euros for conducting a radon test, while 36.6% remain neutral on the matter. On the other hand, 15.4% of individuals stated that they cannot afford the 50 euros required for the radon test.

Similarly, more than 48% of people in Slovenia expressed their ability to afford 1000 euros for radon remediation if necessary. Approximately 22% neither agreed nor disagreed with this statement, while 14.6% of individuals stated that they could not afford the 1000 euros needed for essential radon remediation in their dwelling.

However, in terms of the financial burden, 48.8% of respondents agree or strongly agree that reducing radon from their home would require more resources than they have, while 35.5% disagree or strongly disagree with this statement.

Table 21: Perceived behavioural control (financial burden) (2i) *RA22a, RA22b*

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA22_a I am confident that I could obtain 50 euros to test for radon if needed.	1956	1	5	3.79	1.034
RA22_b I am confident that I could obtain 1000 euros to remediate for radon if needed.	1918	1	5	3.04	1.254

Table 22: Perceived behavioural control scale

Perceived behavioural control scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA22_a I am confident that I could obtain 50 euros to test for radon if needed.	.760	.779	.725 N=1907 (94.8%)	.747 N=429 (94.7%)
RA22_b I am confident that I could obtain 1000 euros to remediate for radon if needed.	.760	.779	58%	61%

Overall, 65.6% of respondents believe that remediating their dwelling to reduce radon would be burdensome for them. A significant majority of respondents (72.9%) express their belief that the procedure for remediating their home due to radon is difficult. However, 58.6% believe that testing their dwelling for radon is relatively easy.

No statistical differences were observed in terms of perceived behavioral control, burden, and ease between areas with high radon risk and areas with low radon risk.

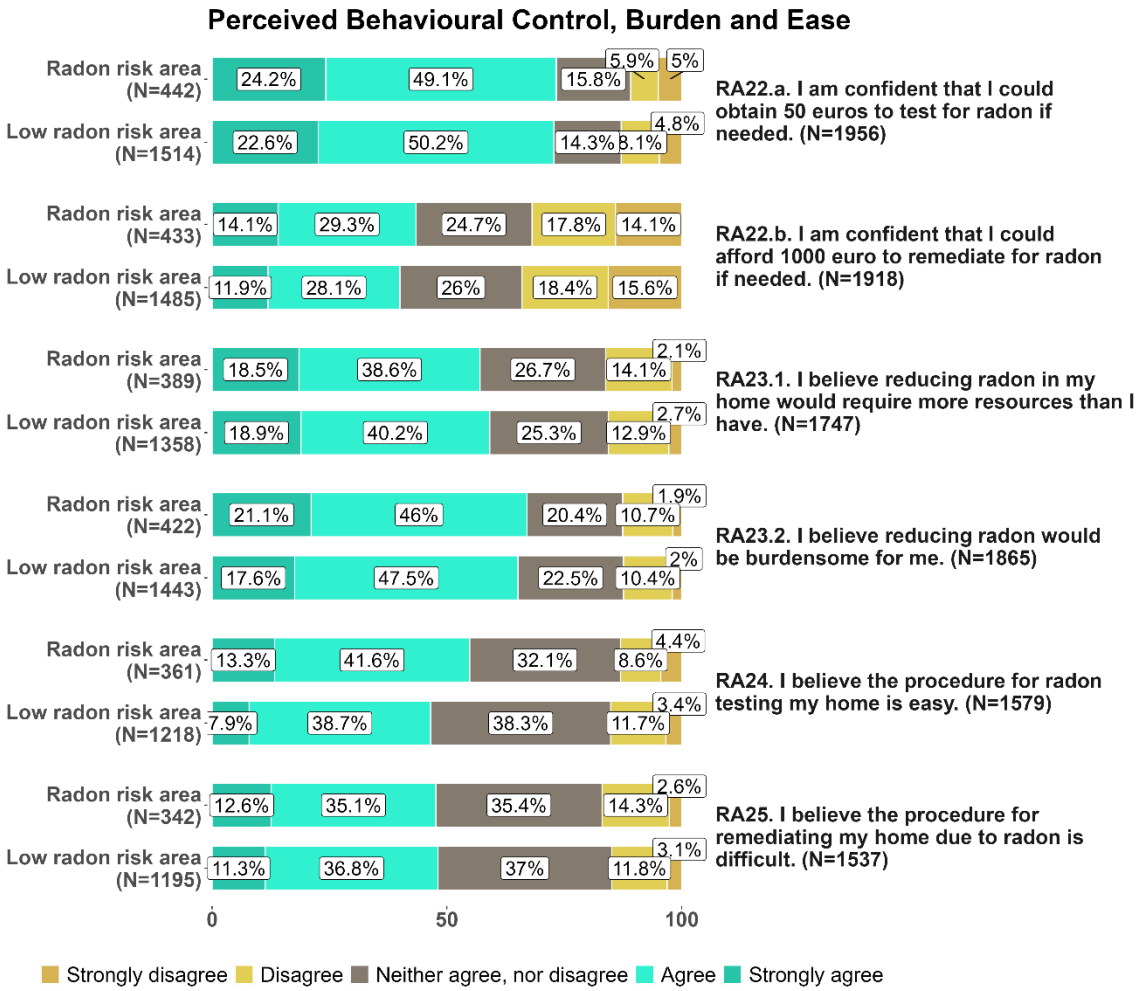
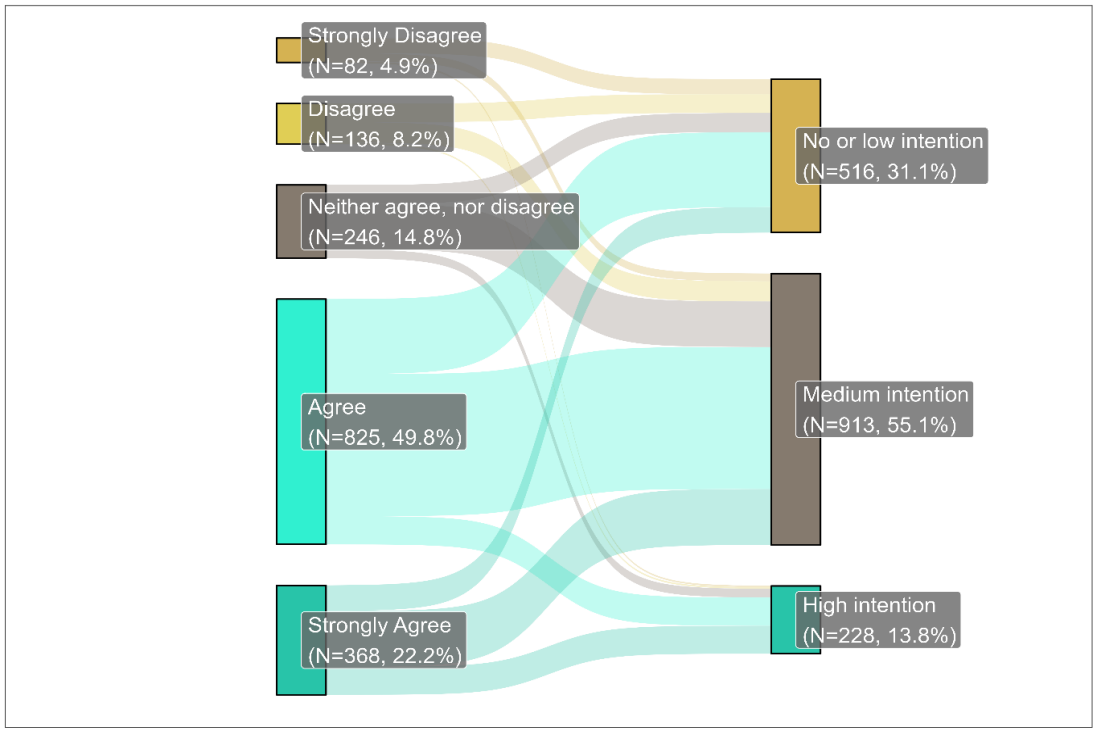


Figure 59: Overview of responses related to financial and other burdon and ease per radon risk area (N = 2012

The **Perceived financial burden scale** was assessed using two-items. Participants were asked to rate their level of agreement on the following four statements: “I am confident that I could obtain 50 euros to test for radon if needed.”; “I am confident that I could obtain 1000 euros to remediate for radon if needed.” All items were rated on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the perceived control scale. The analysis revealed a single factor, which accounted for 58% of the total variance (N=1907 out of 2012). All two-items loaded significantly on the factor (factor loadings: .760), indicating that they shared a common underlying factor. The internal consistency of the scale was found to be high, with a Cronbach’s alpha coefficient of .725, indicating good reliability. The factorial validity of the Intention to protect from radon scale was further confirmed in a sample of individuals living in medium or high radon risk area (N=453). Similar to the national sample, the factor analysis with principal axis factoring showed a single factor solution, explaining 61% of the total variance. All two items loaded significantly on the factor (factor loadings: .779), indicating that the factor structure was consistent across both samples. Internal consistency of the scale was also found to be high in this population, with a Cronbach's alpha coefficient of .747, indicating good reliability.

The findings indicate that individuals who lack confidence in their ability to procure 50 euros for radon testing tend to exhibit minimal or low intentions to take protective measures against radon exposure.



N=1657
56 missing values in Salience
321 mising values in Intention to protect from radon

Figure 60: Perceived behavioural control.

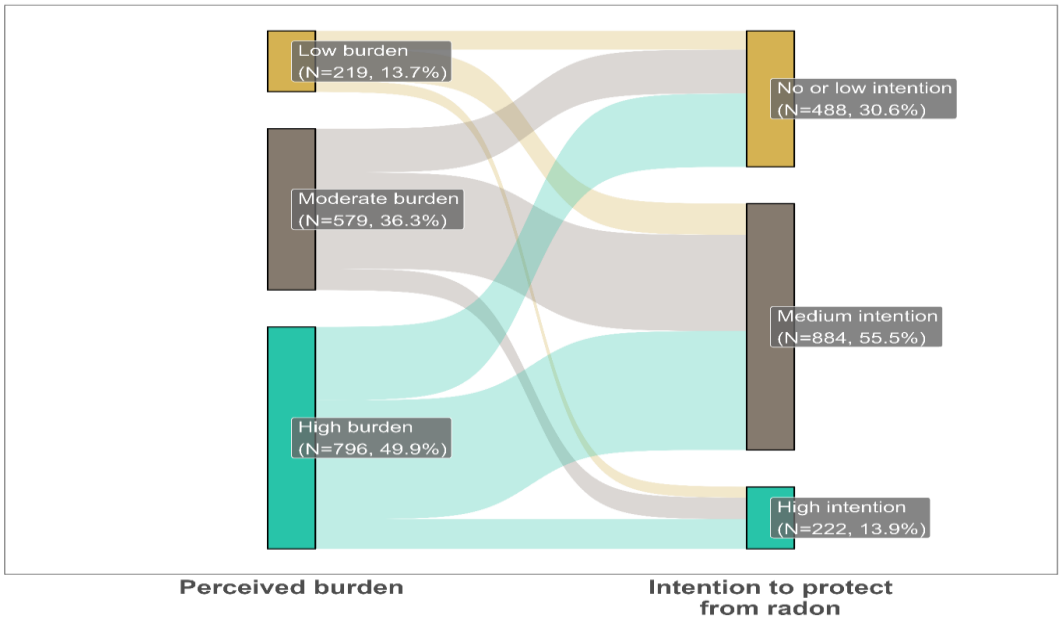
Table 23: Perceived Burden (2i) *RA 23.1, RA23.2.*

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA23_1 I believe reducing radon in my home would require more resources than I have.	1747	1	5	3.59	1.018
RA23_2 I believe reducing radon would be burdensome for me.	1865	1	5	3.70	.953

Table 24: Perceived Burden (2i) *RA 23.1, RA23.2 .*

Perceived burden scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA23_1 I believe reducing radon in my home would require more resources than I have.	.836	.814	.822 N=1738 (86.4%)	.798 N=385 (85.0%)
RA23_2 I believe reducing radon would be burdensome for me.	.836	.814	70%	66%

The **Perceived general burden scale** was assessed using a two-items . Participants were asked to rate their level of agreement on the following two statements: "I believe reducing radon in my home would require more resources than I have."; "I believe reducing radon would be burdensome for me." All items were rated on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the perceived burden scale. The analysis revealed a single factor, which accounted for 70% of the total variance (N=1738 out of 2012). All two items loaded significantly on the factor (factor loadings: .836), indicating that they shared a common underlying factor. The internal consistency of the scale was found to be high, with a Cronbach's alpha coefficient of .822, indicating good reliability. The factorial validity of the Intention to protect from radon scale was further confirmed in a sample of individuals living in medium or high radon risk area (N=453). Similar to the original sample, the factor analysis with principal axis factoring showed a single factor solution, explaining 66% of the total variance. All two items loaded significantly on the factor (factor loadings: .814), indicating that the factor structure was consistent across both samples. Internal consistency of the scale was also found to be high in this population, with a Cronbach's alpha coefficient of .798, indicating good reliability.



N=1594
321 mising values in Intention to protect from radon

Figure 61: Perceive burden and intention to protect from radon.

Table 25: Perceived burden scale.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA24 I believe the procedure for radon testing my home is easy.	1579	1	5	3.39	.927
RA25 I believe the procedure for remediating my home due to radon is difficult.	1537	1	5	3.41	.949

The Perceived ease scale was assessed using a two-item questionnaire. Participants were asked to rate their level of agreement on the following two statements: “I believe the procedure for radon testing my home is easy.”; “I believe the procedure for remediating my home due to radon is difficult.”All items were rated on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the perceived ease scale. This revealed that there was no single explenatory factor. For this reason, an correlation table was constructed. It showed that the two items have a low correlation of -.163.

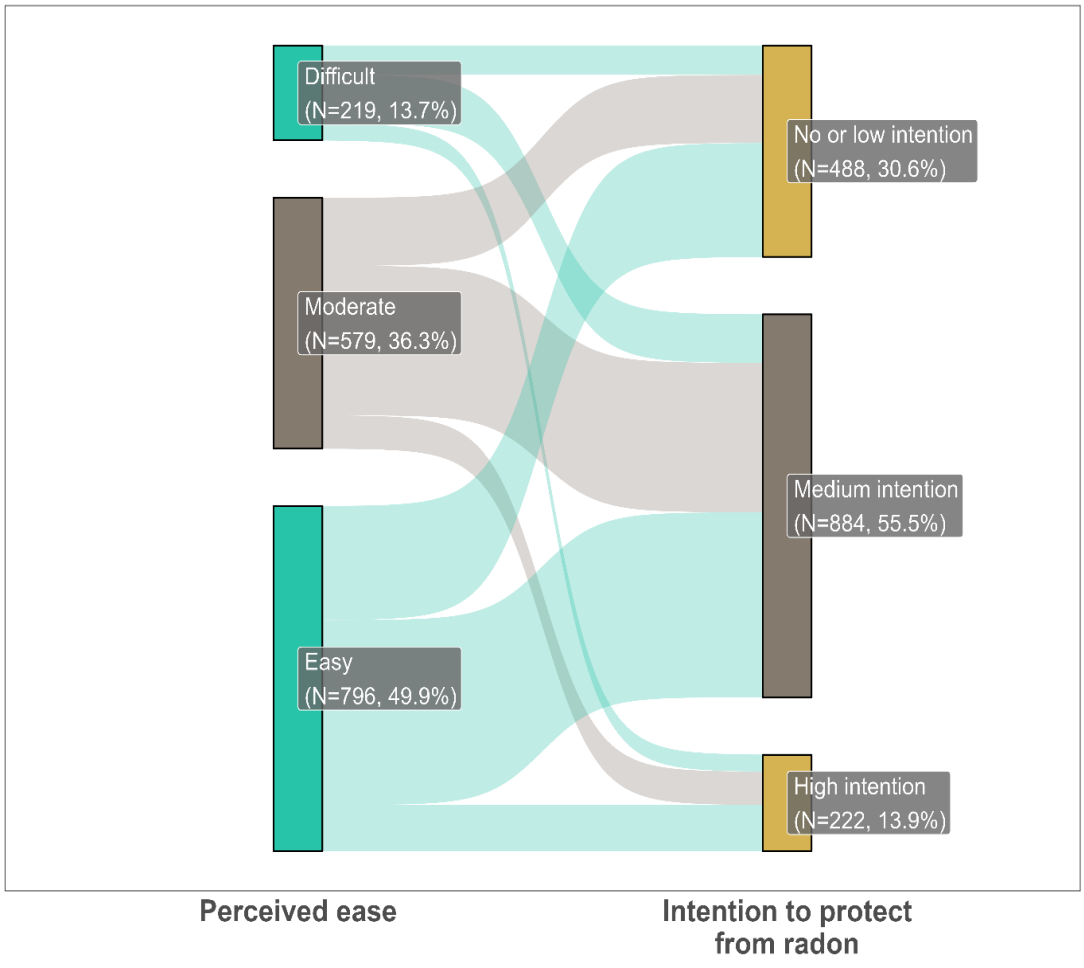


Figure 62: Perceived ease and intention to protect from radon.

4.17 Esthetic impact of remediation works on a dwelling

Esthetic impact of remediation works on a dwelling

The analysis shows that a majority of Slovenians do not believe that radon remediation would visually harm their homes, with a smaller percentage perceiving a significant visual impact. A significant portion of respondents expressed uncertainty or ambivalence about the aesthetic consequences of radon remediation.

The aesthetic impact of radon remediation on participants' homes was assessed using a single-item measurement. Participants were asked to rate their level of agreement with the statement: "Remediation due to exceeded levels of radon would visually destroy my home." The rating was conducted on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

A total of N=1535 valid responses were collected for this item. The mean score for the statement was found to be 2.46, with a standard deviation of 0.878. This indicates that, on average, participants expressed a slightly below-neutral agreement level when considering the aesthetic impact of radon remediation on their homes.

Further, analysis reveals that 54.7% of respondents strongly disagreed or disagreed with the statement, indicating that they do not believe radon remediation would visually destroy their homes. On the other hand, only 10.7% of respondents agreed or strongly agreed with the statement, suggesting that they perceive a significant visual impact from radon remediation. Approximately 34.7% of respondents neither agreed nor disagreed, indicating a level of uncertainty or ambivalence regarding the aesthetic impact.

These findings shed light on participants' perceptions regarding the potential visual consequences of radon remediation specifically in relation to their homes.

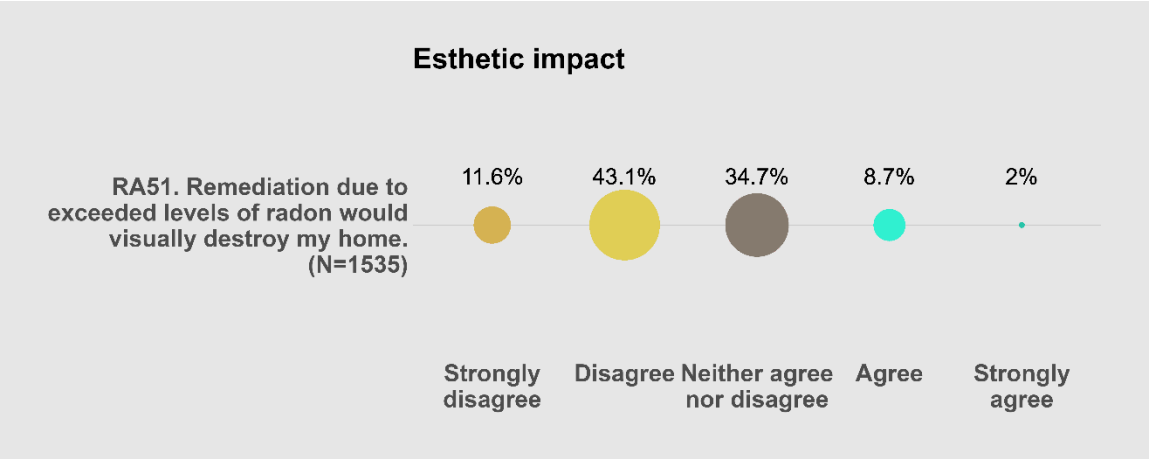


Figure 63: Esthetic Impact

Table 26: Descriptive statistics, Esthetic impact.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA51 Remediation due to exceeded levels of radon would visually destroy my home.	1535	1	5	2.46	.878

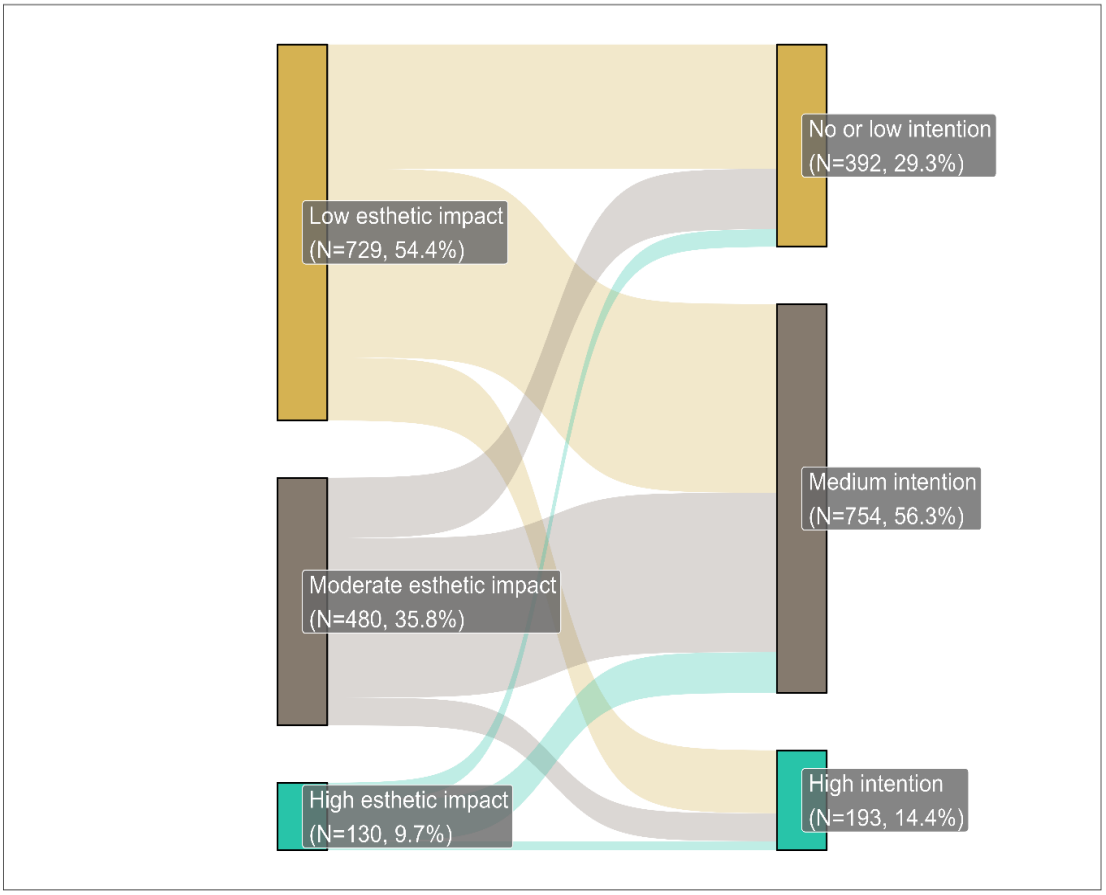


Figure 64: Esthetic impact and intention to protect drom radon.

4.18 Economic impact of radon on a property value

Economic impact of radon on a property value

The study assessed the economic impact of radon on property value using a single-item measurement. Results from N=1829 valid responses revealed that, the majority of respondents (64.7%) agreed or strongly agreed that radon problems can indeed influence the value of a property, indicating their recognition of the potential economic impact associated with radon issues. Approximately 24.2% of respondents neither agreed nor disagreed, suggesting some level of uncertainty or lack of opinion on the matter. Conversely, 11% of respondents disagreed or strongly disagreed with the statement, indicating a perception that radon problems have minimal influence on property value.

These findings provide valuable insights into participants' perspectives on the economic implications of radon on property value. They highlight that a significant portion of respondents acknowledge the potential impact, while a smaller proportion expresses skepticism or lack of concern regarding this matter.

The economic impact of radon on property value was evaluated using a single-item measurement. Participants were asked to rate their level of agreement with the statement: "A radon problem can influence the value of property." The rating was conducted on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

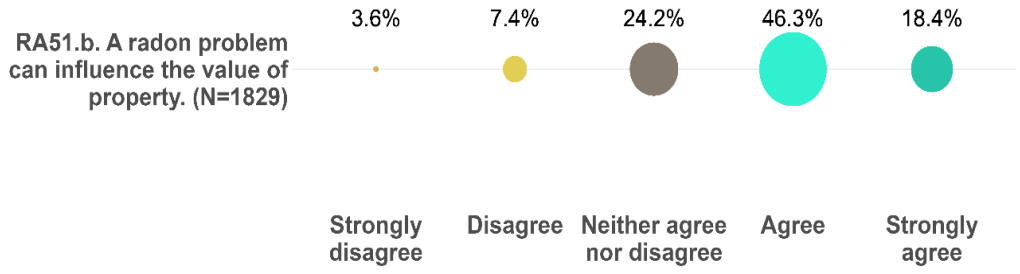


Figure 65: Economic impact of radon on property value.

Table 27: Descriptive statistics, economic impact of radon on property value.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA51_b A radon problem can influence the value of property.	1829	1	5	3.69	.975

A total of N=1829 valid responses were collected for this item. The mean score for the statement was found to be 3.69, with a standard deviation of 0.975. This indicates that, on average, participants expressed a moderate level of agreement regarding the influence of radon problems on property value.

Analysis reveals that the majority of respondents (64.7%) agreed or strongly agreed that a radon problem can indeed influence the value of a property. This suggests that they recognize the potential economic impact associated with radon issues. Approximately 24.2% of respondents neither agreed nor disagreed, indicating some level of uncertainty or lack of opinion on the matter. On the other hand, 11% of respondents disagreed or strongly disagreed with the statement, implying they do not perceive a significant influence of radon problems on property value.

These findings provide valuable insights into participants' perspectives on the economic implications of radon on property value. It indicates that a considerable portion of respondents acknowledge the potential impact, while a smaller proportion expresses skepticism or lack of concern regarding this matter.

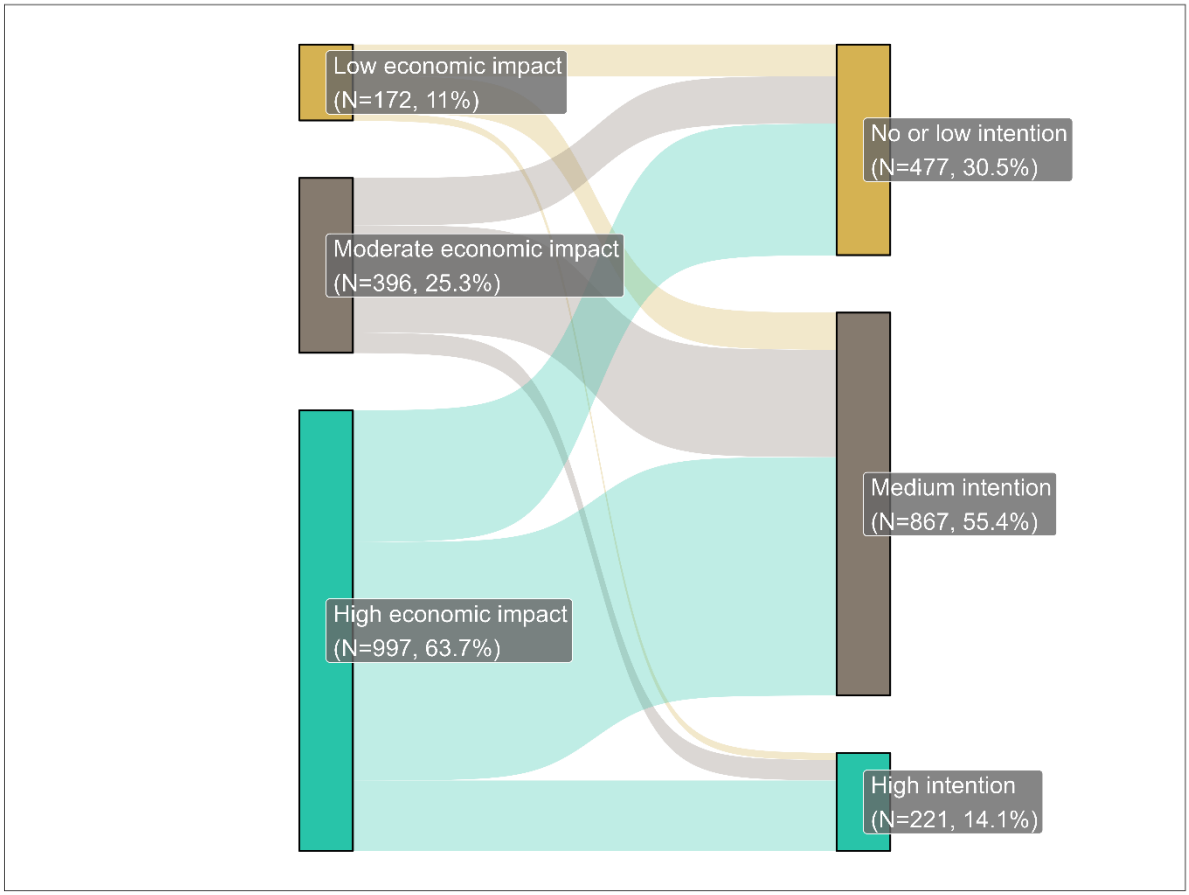


Figure 66: Influence of radon problem on property value and intetntion to protect from radon.

4.19 Subjective norms

Subjective norms

Subjective norms refer to the belief that an important person or group of people will approve and support a particular behaviour, for instance protection against radon (test and/or mitigate). The results of the subjective norms assessment provide valuable insights into participants' perceptions of the support and approval they receive from important individuals regarding radon-related behaviors. The findings indicate that there is a diversity of perspectives among participants.

Regarding radon testing, nearly half of the participants (47.7%) perceive that the important people in their lives are either neutral or unsupportive of them testing for indoor radon. However, an equal percentage (47.7%) believes that the important individuals in their lives are in favor of radon testing.

In terms of radon remediation, a significant proportion of participants (49.4%) believe that the important people in their lives are not supportive of remediating their homes for radon if necessary. On the other hand, 17.9% perceive support from important individuals for radon remediation.

When it comes to being informed about radon, a considerable portion of participants (45.8%) believe that the important people in their lives value their knowledge and awareness about radon. However, 15.6% perceive that these important individuals may not prioritize being informed about radon.

In terms of the care shown by significant individuals in their lives regarding radon-related actions, a majority of participants (54.1%) believe that these individuals do care about their actions related to radon in their homes. Conversely, a small percentage (12%) perceive that these individuals do not place importance on their radon-related actions.

Overall, these findings highlight the varying perspectives participants have regarding the support and approval they receive from important individuals for radon-related behaviors. It emphasizes the importance of understanding the social context surrounding radon testing, radon remediation, and being informed about radon-related issues.

Subjective norms refer to the belief that important individuals or groups of people will approve and support a specific behavior, such as protecting against radon through testing and/or mitigation. To assess subjective norms, a four-item measurement was employed. Participants were asked to rate their level of agreement with the following statements on a 5-point Likert scale, ranging from 1 (very unlikely) to 5 (very likely): "Most people who are important to me are NOT in favor of me testing for indoor radon."; "Most people who are important to me are in favor of me remediating my home for radon if needed."; "In general, people who are important to me would like me to be informed about radon."; "People who are significant in my life don't care about my actions related to radon in my home." The responses from participants provide insights into their perceptions of the subjective norms surrounding radon-related behaviors and the support they expect from important individuals in their lives.

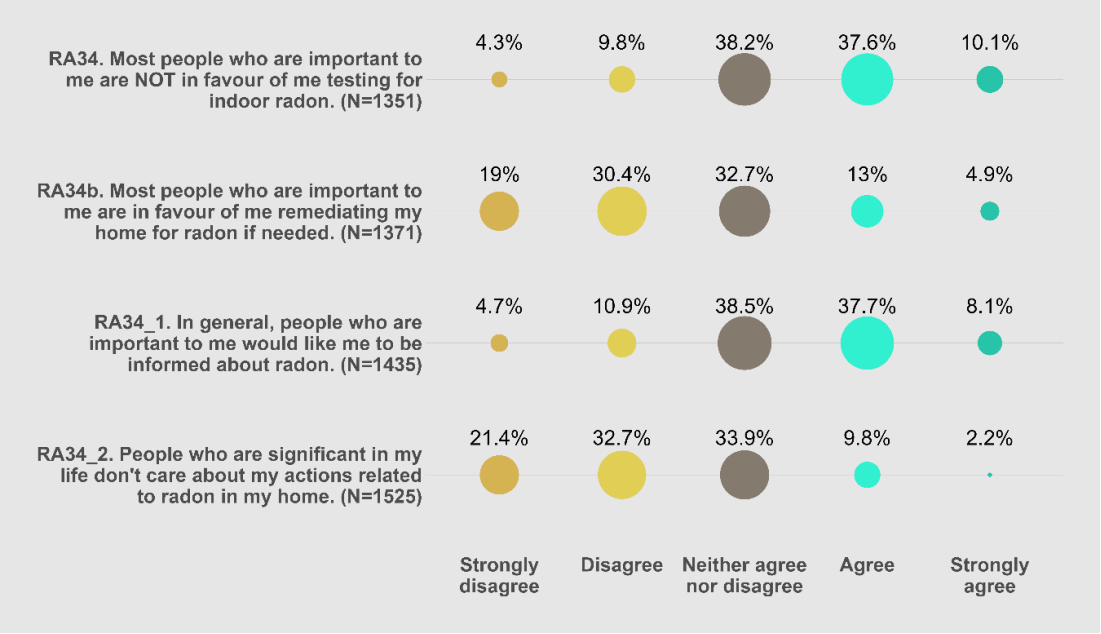


Figure 67: Subjective norms.

Results suggest that there is a significant portion of participants (47.7% combined agreement) who perceive that the important people in their lives are either neutral or not supportive of them testing for indoor radon. However, a notable percentage (47.7% combined agreement) believe that the people important to them are in favor of radon testing.

Responces on a statemement "Most people who are important to me are in favor of me remediating my home for radon if needed" indicate that a significant proportion of participants (49.4% combined disagreement) believe that the important individuals in their lives are not supportive of remediating their homes for radon if necessary. On the other hand, 17.9% of participants (combined agreement) perceive support from important people for radon remediation.
Level of agreement with the statement "In general, people who are important to me would like me to be informed about radon" show that a considerable portion of participants (45.8% combined agreement) believe that the important people in their lives value their knowledge and awareness about radon. However, there is also a notable percentage (15.6% combined disagreement) who perceive that these important individuals may not emphasize being informed about radon.
Results regarding the statement "People who are significant in my life don't care about my actions related to radon in my home" suggest that a majority of participants (54.1% combined disagreement) believe that the important individuals in their lives do care about their actions related to radon in their homes. Conversely, a small percentage (12% combined agreement) perceive that these individuals do not place importance on their radon-related actions.

Overall, these results shed light on the subjective norms participants perceive regarding radon-related behaviors. It indicates that there is a diversity of perspectives, with some participants perceiving support and approval from important individuals, while others perceive varying degrees of disagreement or neutrality. These findings provide valuable insights into participants' beliefs about the social context surrounding radon testing, radon remediation, and being informed about radon-related issues.

No statistically significant difference in subjective norms was observed between areas with high radon risk and areas with low radon risk. This indicates that the perceptions of support and approval from important individuals regarding radon-related behaviors are similar across different radon risk areas. As expected, the subjective norms surrounding radon testing, radon remediation, and being informed about radon do not appear to vary significantly based on the level of radon risk in an area.

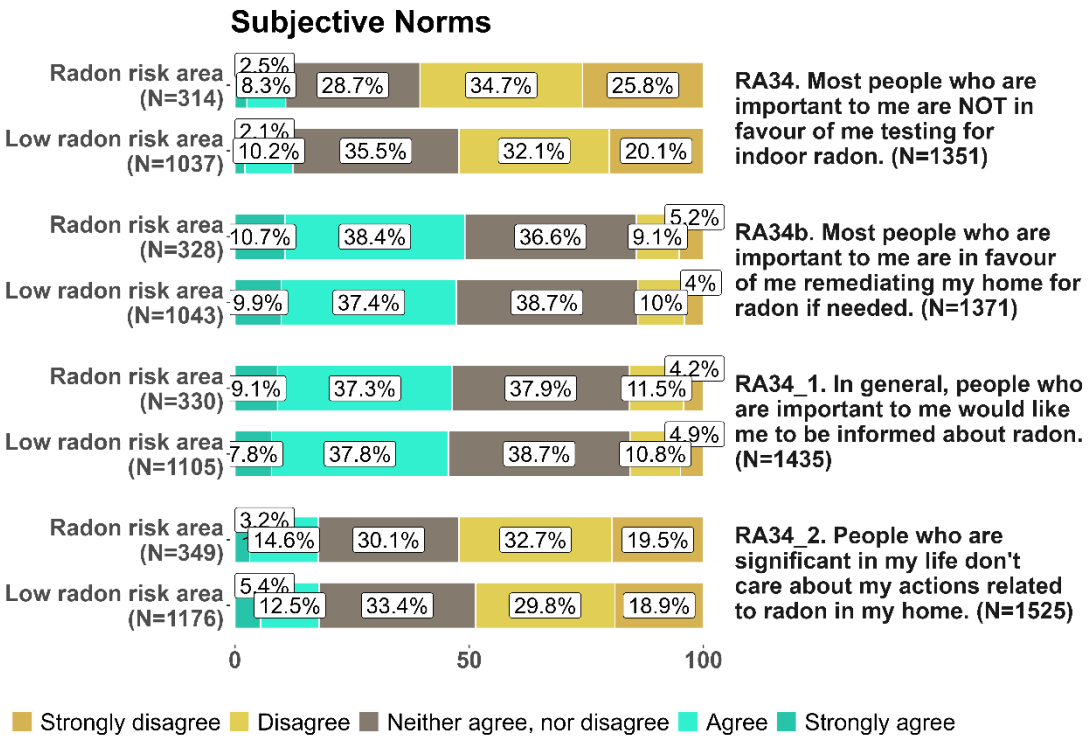


Figure 68: Subjective norms by radon risk area.

Table 28: subjective norms.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA34 Most people who are important to me are NOT in favour of me testing for indoor radon.	1351	1	5	2.39	.997
RA34_b Most people who are important to me are in favour of me remediating my home for radon if needed.	1371	1	5	3.39	.946
RA34_1 In general, people who are important to me would like me to be informed about radon.	1435	1	5	3.33	.942
RA34_2 People who are significant in my life don't care about my actions related to radon in my home.	1525	1	5	2.54	1.088

Table 29: Subjective norms scale.

Subjective norms scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA34 Most people who are important to me are NOT in favour of me testing for indoor radon.	-.465	-.471	.700 N=1230 (61.1%) 39%	.720 N=293 (64.7%) 41%
RA34_b Most people who are important to me are in favour of me remediating my home for radon if needed.	.775	.810		
RA34_1 In general, people who are important to me would like me to be informed about radon.	.696	.680		
RA34_2 People who are significant in my life don't care about my actions related to radon in my home.	-.507	-.551		

The Subjective norms scale, consisting of four items, was used to assess participants' perceptions of support and approval from important individuals regarding radon-related behaviors. The four statements included: "Most people who are important to me are NOT in favor of me testing for indoor radon," "Most people who are important to me are in favor of me remediating my home for radon if needed," "In general, people who are important to me would like me to be informed about radon," and "People who are significant in my life don't care about my actions related to radon in my home." Participants rated their agreement on a 5-point Likert scale ranging from 1 (very unlikely) to 5 (very likely).

To explore the underlying factor structure of the subjective norms scale, principal axis factoring without rotation was performed. The analysis revealed a single factor that accounted for 39% of the total variance, with 1674 out of 2012 valid responses. All four items had significant factor loadings (ranging from .465 to .775), indicating that they shared a common underlying factor.

The internal consistency of the subjective norms scale was found to be high, with a Cronbach's alpha coefficient of .700, indicating good reliability.

To validate the factorial validity of the subjective norms scale, a separate sample of individuals living in medium or high radon risk areas (N=453) was analyzed. Similar to the national sample, the factor analysis using principal axis factoring revealed a single factor solution. The total variance explained by this analysis was 41%, and all four items loaded significantly on the factor (ranging from .471 to .810), indicating a shared underlying factor. The internal consistency of the scale in this sample was also high, with a Cronbach's alpha coefficient of .720, indicating good reliability.

Overall, the results demonstrate that the subjective norms scale has a single-factor structure and exhibits good reliability in both the national sample and the validation sample. This suggests that the scale effectively measures participants' perceptions of support and approval from important individuals regarding radon-related behaviors.

4.20 Descriptive norms

Descriptive norms

Descriptive norms refer to the perception of what is considered typical or normal behavior within a group. It involves understanding what most people in a specific context think, feel, or do. In the context of radon, descriptive norms pertain to individuals' perceptions of others' behavior regarding testing for radon and mitigating their homes.

The results revealed that there is a significant belief among participants that most people in their neighborhood have tested their houses for indoor radon. However, participants expressed a prevailing perception that the people they know, including their friends, do not engage in activities related to indoor radon. Additionally, participants perceived that remediation of houses for radon, when levels exceed the limits, is not a common practice in their neighborhood. These findings provide insights into participants' perceptions of the prevalence of radon-related behaviors in their community and social networks.

Furthermore, we examined whether descriptive norms could predict the intention to safeguard against radon. The results clearly demonstrate that when individuals perceive radon testing and mitigation as customary or typical behaviors within their social group, they are more likely to engage in testing and mitigation measures.

Descriptive norms refer to the perception of what is considered typical or normal behavior within a group. It involves understanding what most people in a specific context think, feel, or do. In the context of radon, descriptive norms pertain to individuals' perceptions of others' behavior regarding testing for radon and mitigating their homes.

To assess descriptive norms, a four-item scale was used. Participants were asked to rate their level of agreement with the following statements: "I believe most people in my neighborhood tested their houses for indoor radon," "I believe most people that I know do something related to indoor radon," "I believe most people in my neighborhood remediated their houses when indoor radon levels exceeded the limits," and "As far as I know, most of my friends living in the same neighborhood did not test their houses." Ratings were done on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

By assessing these perceptions, we gain insights into how individuals perceive the behavior of others in their social environment related to radon. It provides an understanding of the prevailing norms and can influence an individual's own beliefs and behaviors regarding radon testing and mitigation.

It's important to note that descriptive norms may play a role in shaping individuals' decisions and actions. When people perceive that others in their neighborhood or social circle are engaging in radon-related behaviors, it can influence their own likelihood of testing their homes or taking necessary measures to mitigate radon levels.

In summary, the assessment of descriptive norms through the four-item scale provides valuable insights into individuals' perceptions of others' behavior regarding radon testing and mitigation. These perceptions can influence individuals' own actions and contribute to a better understanding of social dynamics related to radon in specific neighborhoods or social circles.

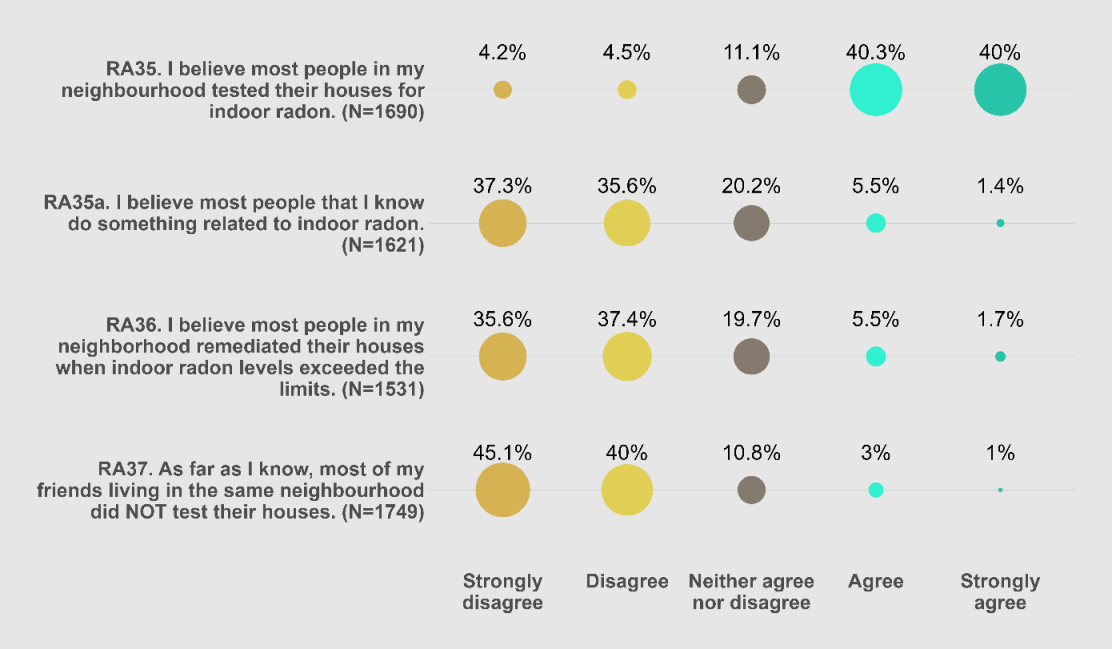


Figure 69: Descriptive norms.

"I believe most people in my neighborhood tested their houses for indoor radon": Among the participants, 4.2% strongly disagreed, 4.5% disagreed, 11.1% neither agreed nor disagreed, 40.3% agreed, and 40% strongly agreed with the statement. These findings suggest that there is a significant perception among participants that most people in their neighborhood have tested their houses for indoor radon. The majority of participants (80.3% combined agreement) endorsed the belief that radon testing is a common practice in their neighborhood.

"I believe most people that I know do something related to indoor radon": The responses to this statement indicate that 37.3% of participants strongly disagreed, 35.6% disagreed, 20.2% neither agreed nor disagreed, 5.5% agreed, and 1.4% strongly agreed. These results suggest a prevailing belief among participants that most people they know do not engage in activities related to indoor radon. The majority of participants (73% combined disagreement) expressed the perception that radon-related actions are not commonly undertaken by the people they know.

"I believe most people in my neighborhood remediated their houses when indoor radon levels exceeded the limits": The data show that 35.6% of participants strongly disagreed, 37.4% disagreed, 19.7% neither agreed nor disagreed, 5.5% agreed, and 1.7% strongly agreed with the statement. These findings suggest that participants have a perception that remediation of houses for radon, when levels exceed the limits, is not a common practice in their neighborhood. The majority of participants (73% combined disagreement) expressed the belief that most people in their neighborhood do not undertake remediation in such cases.

"As far as I know, most of my friends living in the same neighborhood did not test their houses": Among the participants, 45.1% strongly disagreed, 40% disagreed, 10.8% neither agreed nor disagreed, 3% agreed, and 1% strongly agreed. These results indicate that participants, to the best of their knowledge, believe that most of their friends living in the same neighborhood have not tested their houses for radon. The majority of participants (85.1% combined disagreement) expressed the belief that their friends have not undertaken radon testing.

Overall, these findings shed light on participants' perceptions of the descriptive norms related to radon-related behaviors. It indicates that participants believe that radon testing is common in their neighborhood, but they perceive a lack of engagement in radon-related actions among the people they know, including remediation efforts and testing by their friends.

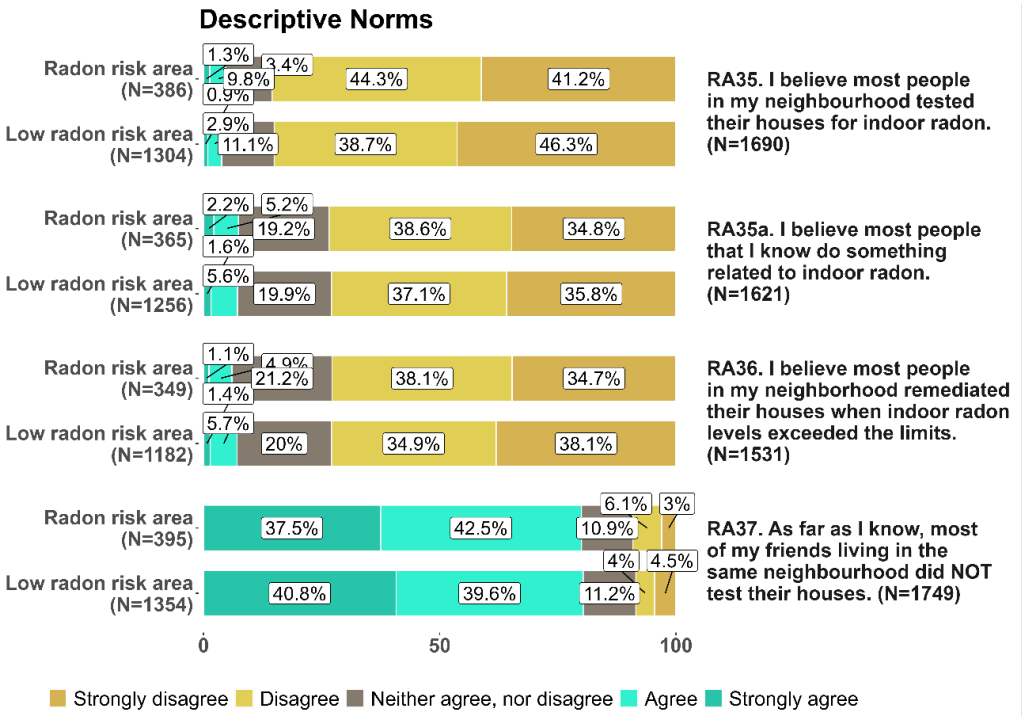


Figure 70: Descriptive norms by radon risk area.

The analysis examined whether there was a statistically significant difference in descriptive descriptive norms between areas with high radon risk and areas with low radon risk. The results revealed that there was no statistically significant difference in descriptive norms between these two types of areas as expected. This suggests that participants' perceptions of what is typical or normal behavior regarding radon-related actions, such as testing houses, engaging in radon-related activities, or remediating houses when radon levels exceed limits, did not differ significantly between areas with high radon risk and areas with low radon risk. Whether individuals live in areas with high or low radon risk, they hold similar perceptions of what others in their neighborhood or social circles do regarding radon-related actions.

Table 30: Descriptive norms.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA35 I believe most people in my neighbourhood tested their houses for indoor radon.	1690	1	5	1.75	.841
RA35a I believe most people that I know does something related to indoor radon.	1621	1	5	2.00	.964
RA36 I believe most people in my neighborhood remediated their houses when indoor radon levels exceeded the limits.	1531	1	5	1.98	.958
RA37 As far as I know, most of my friends living in the same neighbourhoud did NOT test their houses.	1749	1	5	4.07	1.030

Table 31: Descriptive norms by radon risk area.

Descriptive norms scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA35 I believe most people in my neighbourhood tested their houses for indoor radon.	.803	.770	.798 N=1402(69.7%) 57%	.758 N=316(69.8%) 53%
RA35a I believe most people that I know does something related to indoor radon.	.714	.592		
RA36 I believe most people in my neighborhood remediated their houses when indoor radon levels exceeded the limits.	.753	.803		
RA37 As far as I know, most of my friends living in the same neighborhoud did NOT test their houses.	excluded	Excluded		

The descriptive norms scale, consisting of four items, was used to assess participants' perceptions of others' behavior regarding indoor radon-related actions. The items focused on beliefs about radon testing, radon-related activities, and remediation behaviors. Participants rated their agreement on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

To explore the underlying factor structure of the descriptive norms scale, a principal axis factoring analysis without rotation was conducted. The analysis revealed a single factor solution, indicating that

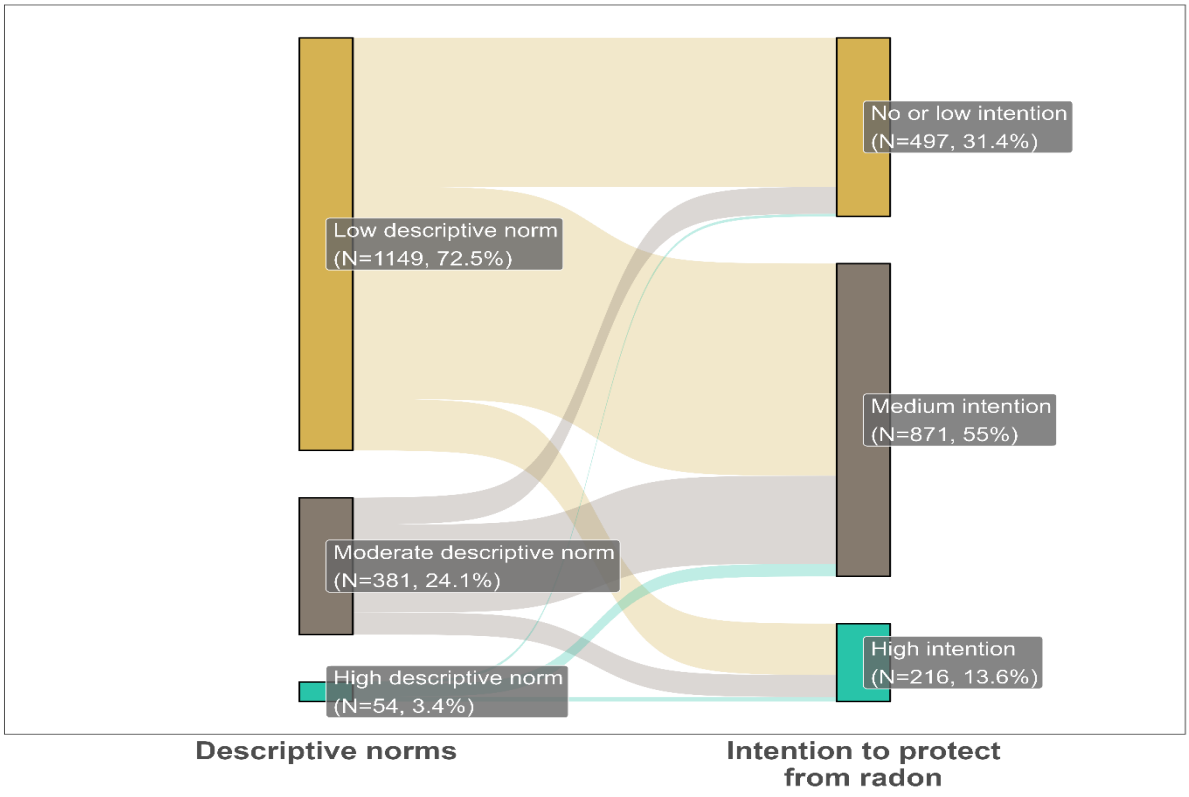
the items shared a common underlying factor. However, it was found that one of the items, statement RA37, did not load significantly on the factor and was subsequently excluded from further analysis.

The remaining three items showed significant loadings on the factor, with factor loadings ranging from .714 to .803. The single factor solution explained 57% of the total variance, indicating that the items collectively captured a substantial portion of the variability in participants' perceptions of descriptive norms. Moreover, the scale demonstrated good internal consistency, as indicated by a high Cronbach's alpha coefficient of .798, suggesting reliable measurement.

The factorial validity of the descriptive norms scale was also confirmed in a separate sample of individuals residing in medium or high radon risk areas, consisting of N=453 participants. Similar to the national sample, a single factor solution was observed in the factor analysis, with two items loading significantly on the factor. Again, question RA37 was excluded due to its lack of significant loading. The total explained variance accounted for 53%, and the factor loadings ranged from .592 to .803. The internal consistency of the scale in this population was also found to be high, with a Cronbach's alpha coefficient of .758, further supporting its reliability.

Overall, the findings suggest that the descriptive norms scale effectively measures participants' perceptions of others' behaviors related to indoor radon. The scale demonstrated good factorial validity and reliability in both the original sample and the sample from medium or high radon risk areas. These results provide a robust foundation for assessing descriptive norms and understanding individuals' beliefs about the behavior of others in relation to radon-related actions.

Furthermore, we examined whether descriptive norms could predict the intention to safeguard against radon. The results clearly demonstrate that when individuals perceive radon testing and mitigation as customary or typical behaviors within their social group, they are more likely to engage in testing . mitigation measures.



N=1584

Figure 71: Descriptive norms and intention to protect from radon.

4.21 Health effect perception

Health effect perception: knowing people who may have health problems due to radon

"Health effect perception" refers to individuals' personal beliefs about the health consequences of radon exposure. A majority of participants (84.2%) reported not personally knowing anyone who might have experienced health issues due to radon. Nevertheless, those who do have such personal acquaintances are more likely to consider radon testing and mitigation measures.

Health effect perception refers to an individual's subjective beliefs and opinions regarding the potential health consequences associated with a specific factor. In the context of this study, the participants were asked to rate their level of agreement with a single statement: "I personally know people who may have health problems due to radon." The item was rated on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

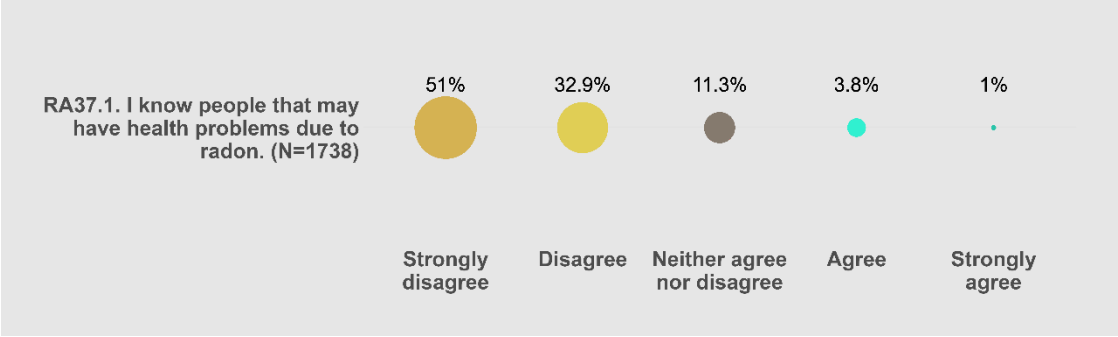


Figure 72: Health effect perception.

Analyzing the distribution of responses, it was observed that the majority of participants expressed strong disagreement with the statement, with 51% of respondents selecting the option "strongly disagree". Furthermore, 32.9% of participants disagreed, 11.3% neither agreed nor disagreed, 3.8% agreed, and only 1% strongly agreed with the statement. These findings suggest that a significant proportion of participants do not personally know individuals who they believe may have health problems due to radon.

The analysis also reveals that those individuals who do have personal acquaintances with radon-related health issues are potentially more inclined to undergo radon testing and implement mitigation measures.

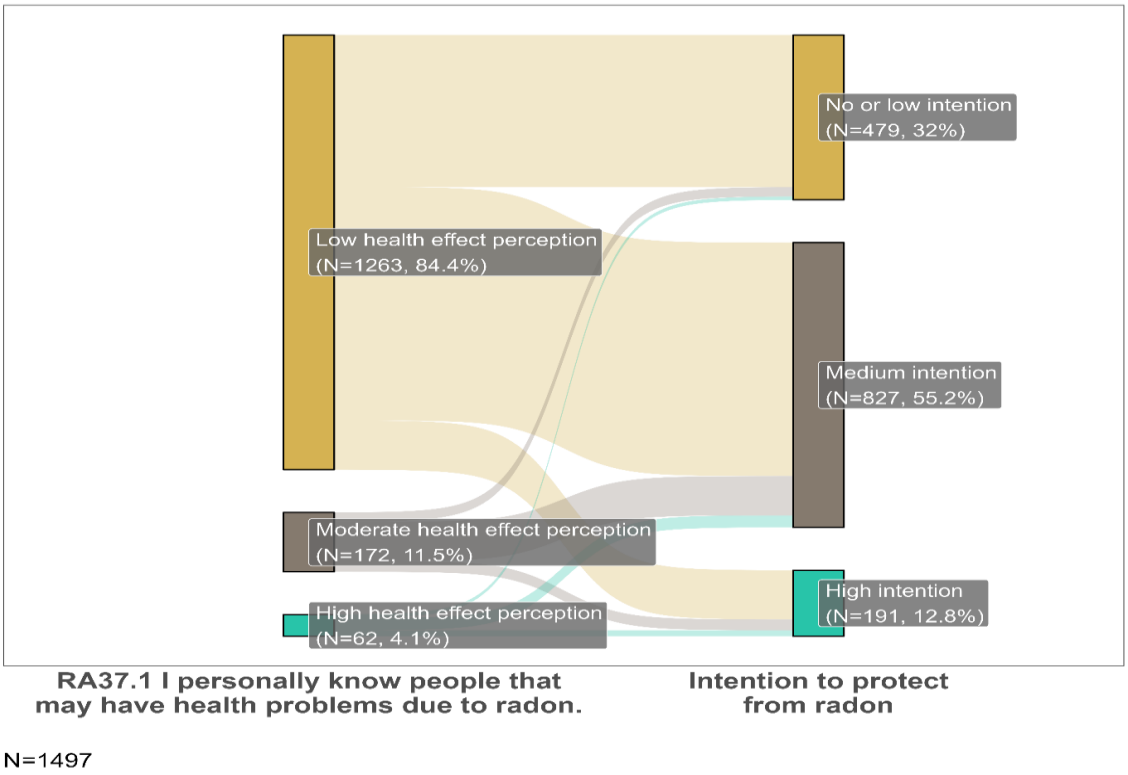


Figure 73: Health effect perception and intention to protect from radon.

4.22 Stigma

Stigma

The study explored participants' attitudes towards the handling of radon-related issues, with a focus on the potential stigma associated with them. Interestingly, the results indicate that a majority of participants are quite open to discussing radon matters, as 69.1% disagreed with the notion of keeping a radon problem secret, and 80.4% disagreed with the idea of being cautious about sharing radon-related information.

Stigma is a social phenomenon characterized by the disapproval or negative judgment associated with a particular circumstance, attribute, or individual. In the context of property, stigma denotes the adverse perception and association of a property with factors that can detrimentally affect its value and market appeal. Stigma of place conveys a sense of contamination or tarnishment, often intertwined with the notion of contagion. Importantly, this stigma endures even after the removal of the source of contamination. Unlike the concept of risk, which pertains to the perceived potential for harm, stigma directly influences property values by causing people to actively avoid or reject specific properties or neighborhoods. For instance, participants of a radon related studies have cited stigma as a significant barrier to domestic radon testing and preventive actions (Khan & Chreim, 2019).

To assess the potential stigma related to radon, participants were presented with two statements to rate their agreement level. These statements focused on the willingness to keep a radon problem a secret and the caution exercised in disclosing a radon problem in their homes. Participants responded on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree).

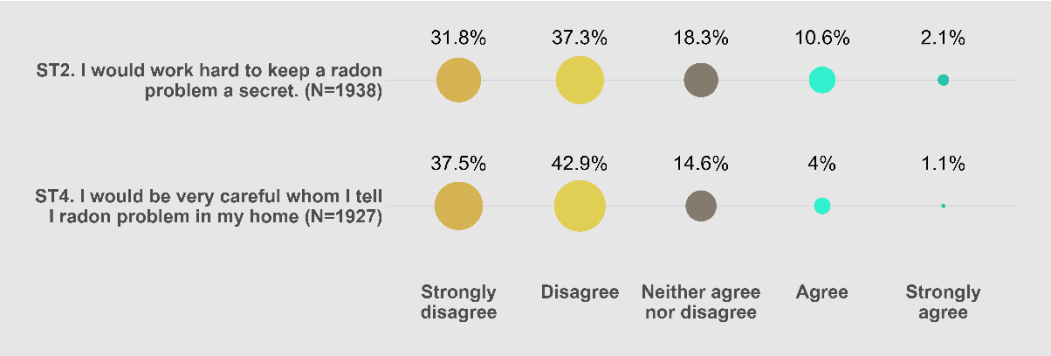


Figure 74: Stigma related to radon.

In relation to the first statement, "I would work hard to keep a radon problem a secret," the data shows that 31.8% of participants strongly disagree, 37.3% disagree, 18.3% neither agree nor disagree, 10.6% agree, and 2.1% strongly agree. These findings suggest a range of attitudes towards keeping a radon problem confidential. The majority of participants (69.1% combined disagreement) expressed disagreement or strong disagreement, indicating no or low stigma related to radon. However, a notable proportion (12.7%) indicated some level of agreement or strong agreement with the statement, implying a potential willingness to keep such problems private. Regarding the second statement, "I would be very careful whom I tell about a radon problem in my home," the results show that 37.5% of participants strongly disagree, 42.9% disagree, 14.6% neither agree nor disagree, 4% agree, and 1.1% strongly agree. These findings suggest a similar pattern to the first statement, with the majority of participants (80.4% combined disagreement) expressing openess to share information about a radon problem with others. However, a small percentage (5.1%) indicated some level of agreement or strong agreement, highlighting a certain level of caution and selectivity in disclosing radon-related issues.

These results provide insights into participants' attitudes and perceptions regarding the potential stigma associated with radon problems. The data suggests that while the majority of participants are inclined to be open about radon concerns, a very small proportion express a degree of hesitation or a preference for privacy.

Table 32: Stigma related to radon.

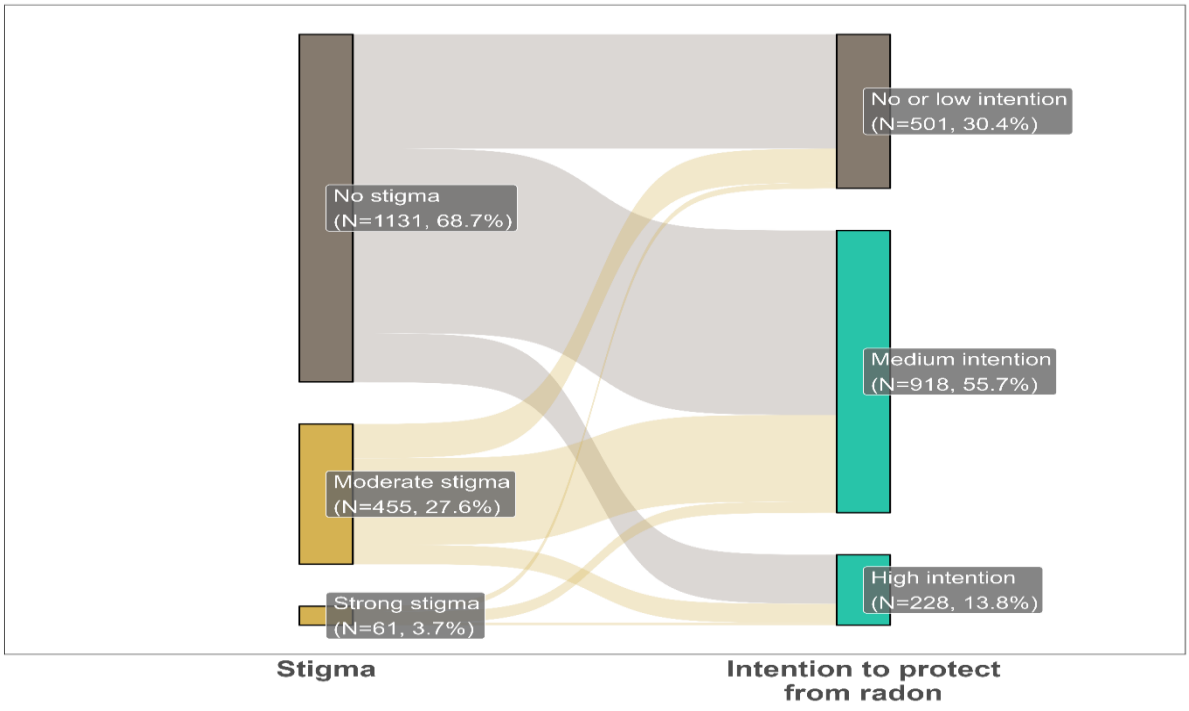
Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
ST2 I would work hard to keep a radon problem a secret.	1938	1	5	1.88	.874
ST4 I would be very careful whom I tell I radon problem in my home.	1927	1	5	2.14	1.046

Table 33: Stigma scale related to radon.

Stigma scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
ST2 I would work hard to keep a radon problem a secret.	.792	.812	.764 N=1915(95.2%) 63%	.787 N=440(97.1%) 66%
ST4 I would be very careful whom I tell I radon problem in my home.	.792	.812		

The stigma scale, consisting of two items, was employed to assess participants' potential stigma related to radon problems. Principal axis factoring analysis without rotation was conducted to explore the underlying factor structure of the scale. The analysis revealed a single factor that accounted for 63% of the total variance in the original sample (N=1915 out of 2012). Both items exhibited significant factor loadings (.792), indicating shared underlying dimensions. The scale demonstrated high internal consistency, as evidenced by a Cronbach's alpha coefficient of .764, indicating good reliability.

The factorial validity of the scale was further confirmed in a separate sample of individuals residing in medium or high radon risk areas (N=453). Consistent with the national sample, the factor analysis exhibited a single factor solution, explaining 66% of the total variance. Both items loaded significantly on the factor (.812), indicating consistent factor structure across the samples. The scale also demonstrated high internal consistency in this population, with a Cronbach's alpha coefficient of .787, indicating good reliability.
In addition, results show that there is no relation between stigma and radon protection behaviour.



N=1647

Figure 75: Stigma related to radon and intention to protect from radon.

4.23 Information processing

Information processing

People engage in two primary modes of information processing: heuristic and systematic. Heuristic processing involves relying on existing knowledge and making quick judgments with minimal effort, while systematic processing involves a more deliberate and effortful evaluation of information, often through scientific or rational considerations.

People engage in two primary modes of information processing: heuristic and systematic. Heuristic processing involves relying on existing knowledge and making quick judgments with minimal effort, while systematic processing involves a more deliberate and effortful evaluation of information, often through scientific or rational considerations.

This survey aims to assess how respondents process information related to radon through both systematic and heuristic approaches. The systematic processing method focuses on rational considerations, as reflected in the provided statements. Respondents were asked to rate their agreement level using a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree." The statements measuring systematic information processing include: "In order to be completely informed about home remediation, I think that the more viewpoints I get, the better off I will be."; "I have been very attentive to the information related to radon remediation."; "When the topic of radon remediation came up, I tried to learn more about it."; "It is important for me to clarify how I should remediate my home."; “When I encountered information about radon remediation of homes, I carefully considered it.”

Additionally, the survey also explores heuristic processing through the following statements: "On issues like radon home remediation, I just go with my gut feeling."; "Past experiences with health-related issues have made it easier for me to form an opinion about the need to remediate my home."; "On the matter of remediation, I shall simply place my trust in the experts and respect their recommendations."; "Related to decisions concerning radon remediation, I follow people from my environment, e.g., family, neighbors."; "I could easily form an opinion about the need to remediate my home without seeking additional information, based on my existing knowledge." All items were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

By examining participants' responses to these statements, the survey seeks to gain insights into their reliance on systematic or heuristic approaches when processing radon-related information.

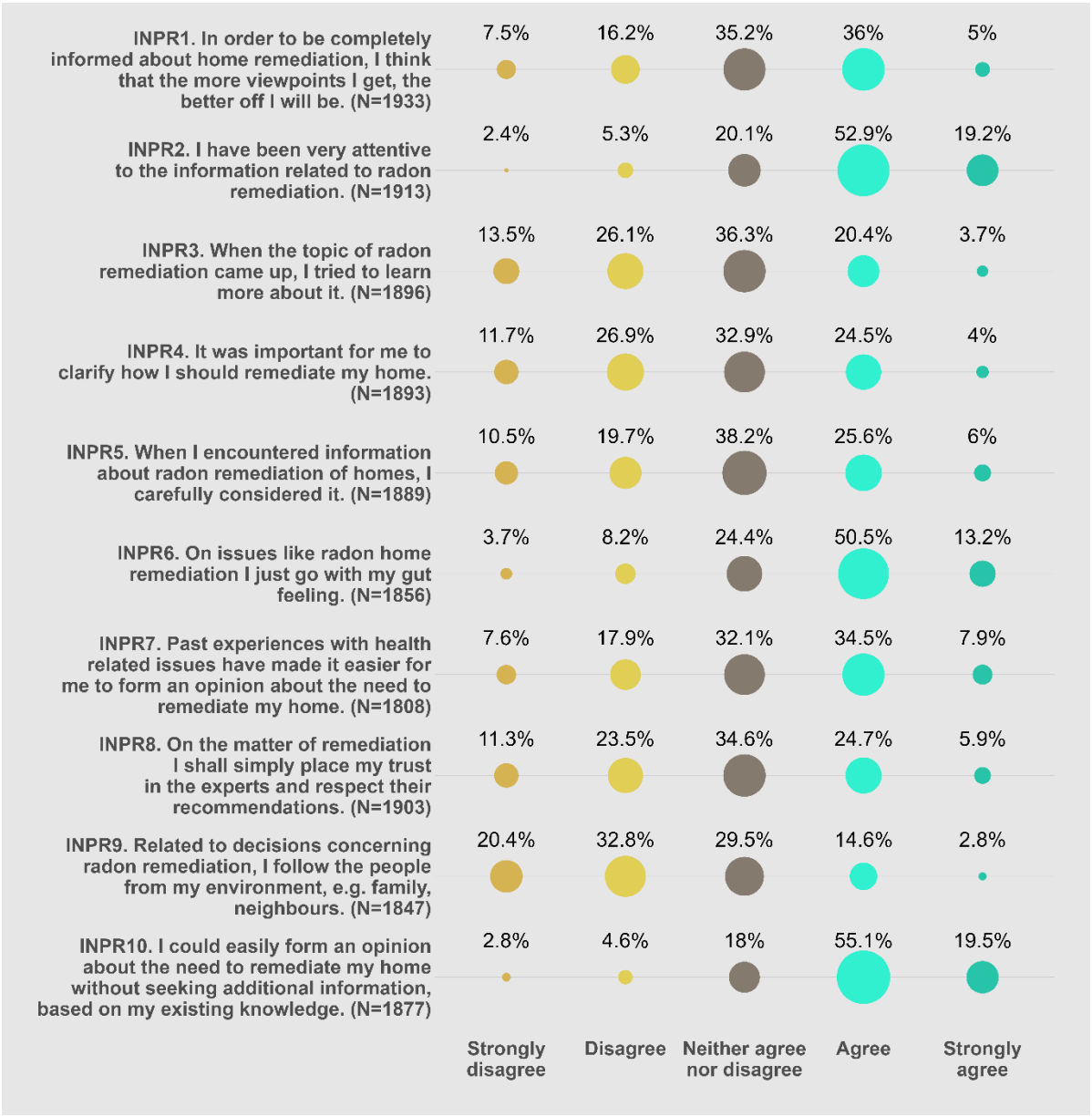


Figure 76: Reliance on systematic or heuristic approaches when processing radon-related information.

Table 34: Descriptive statistics, information processing.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
INPR1 In order to be completely informed about home remediation, I think that the more viewpoints I get, the better off I will be.	1933	1	5	3.84	.886
INPR2 I have been very attentive to the information related to radon remediation.	1913	1	5	2.90	1.078
INPR3 When the topic of radon remediation came up, I tried to learn more about it.	1896	1	5	3.17	1.055
INPR4 It is important for me to clarify how I should remediate my home.	1893	1	5	3.61	.943
INPR5 When I encountered information about radon remediation of homes, I carefully considered it.	1889	1	5	2.97	1.055
INPR6 On issues like radon home remediation I just go with my gut feeling.	1856	1	5	2.82	1.054
INPR7 Past experiences with health related issues have made it easier for me to form an opinion about the need to remediate my home.	1808	1	5	2.75	1.044
INPR8 On the matter of remediation I shall simply place my trust in the experts and respect their recommendations.	1903	1	5	3.81	.888
INPR9 Related to decisions concerning radon remediation, I follow the people from my environment, e.g. family, neighbours.	1847	1	5	3.15	1.001
INPR10 I could easily form an opinion about the need to remediate my home without seeking additional information, based on my existing knowledge.	1877	1	5	2.47	1.056

The **Systematic Information Processing scale** was assessed using a five-item scale. Participants were asked to rate their level of agreement on the following five statements: “In order to be completely informed about home remediation, I think that the more viewpoints I get, the better off I will be”; “I have been very attentive to the information related to radon remediation”, “When the topic of radon remediation came up, I tried to learn more about it”; “It was important for me to clarify how I should remediate my home” and “When I encountered information about radon remediation of homes, I carefully considered it”. All items were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the Systematic Information Processing scale. The analysis revealed a single factor, which accounted for 62% of the total variance(N=1799 out of 2012). All five items loaded significantly on the factor (range of factor loadings: .48 to .87), indicating that they shared a common underlying factor. The internal consistency of the scale was found to be high, with a Cronbach’s alpha coefficient of .85, indicating good reliability. The factorial validity of the Systematic Information Processing scale was further confirmed in a sample of individuals living in medium or high radon risk area (N=467). Similar to the national sample, the factor analysis with principal axis factoring showed a single factor solution, explaining 61% of the total variance. All five items loaded significantly on the factor (range of factor loadings: .47 to .87), indicating that the factor structure was consistent across both samples. Internal consistency of the scale was also found to be high in this population, with a Cronbach's alpha coefficient of .85, indicating good reliability.

Results also indicate, that low systematic information processing is related to low intention to prevent from radon.

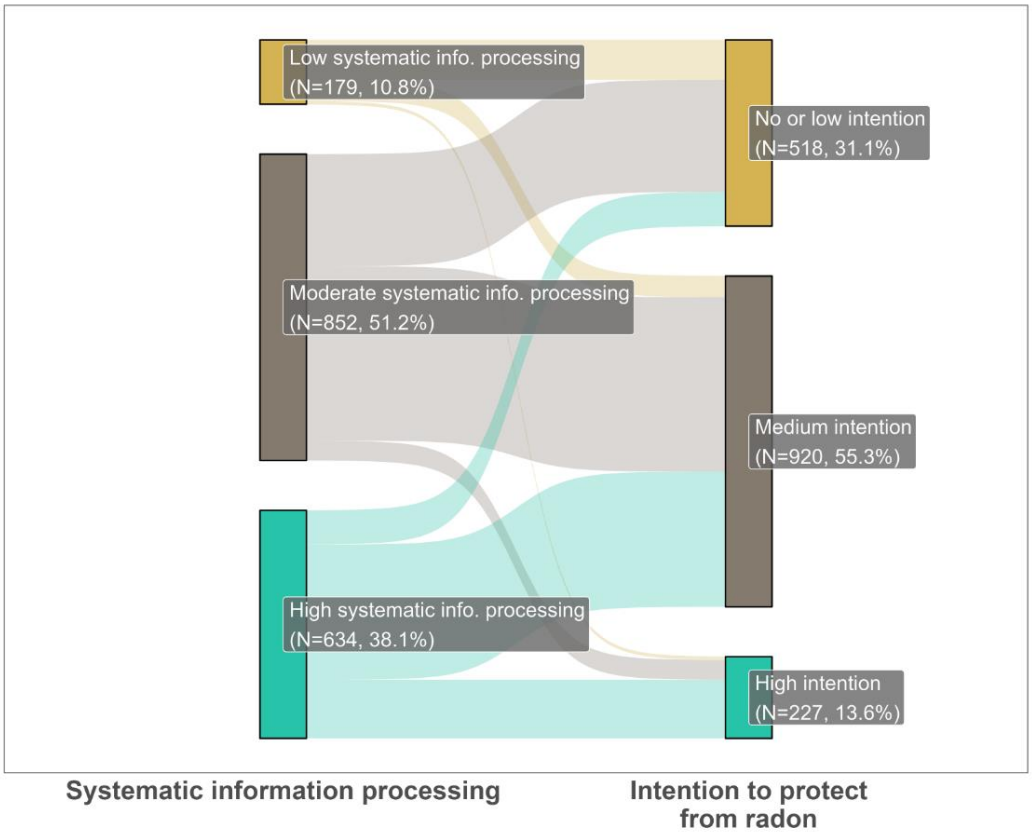


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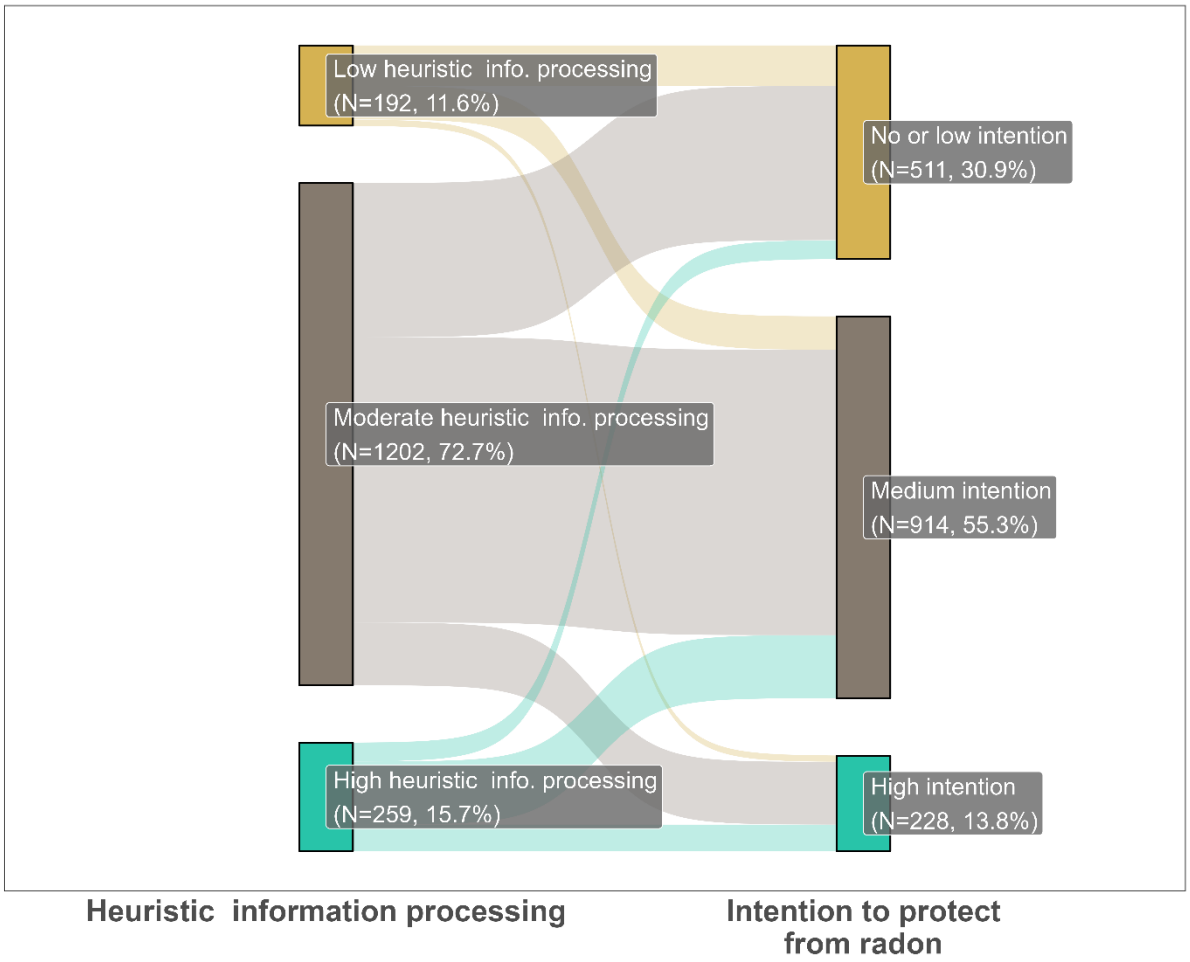
Figure 77: Systematic information processing and intention to protect from radon.



N=1653

Figure 78: Heuristic information processing and intention to protect from radon.

4.24 Information comprehensiveness

Information comprehensiveness

Information comprehensiveness measures the extent to which respondents have sufficient information concerning radon and performing radon tests at home. In general, most of the respondents feel well in informed about which actios are needed related to indoor radon levels and most of them they also feel that there is enough information for them to decide whether they should perform a radon test at home.

Information comprehensiveness measures the extent to which respondents have sufficient information concerning radon and performing radon tests at home. In the frame of the survey, the comprehensiveness was assessed based on two statements. Respondents had to indicate on a 5-point Likert scale whether they agreed with the following statements: "I don't feel well informed about which

actions are needed related to indoor radon levels" and "There is enough information for me to decide whether I should perform a radon test at home**".**

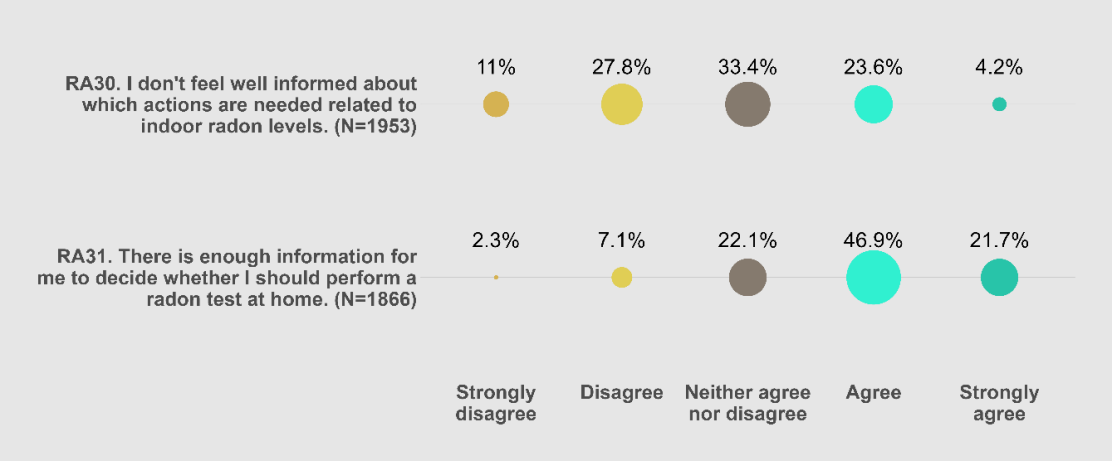


Figure 79: Information Comprehensiveness on radon anf performing radon test at home.

As shown in the figure above, 38.3% of the respondents feel well informed about which actions are needed related to indoor radon levels. Approximately 33% of the answers indicate that the population neither agrees nor disagrees. The remaining respondents (27.8%) consider their knowledge rather limited to estimate the needed actions. In addition, the results of the survey indicate that the majority of the respondents (68.8%) feel well informed about whether or not to test for radon indoors. Just under 10% do not concur with this opinion and indicate they (strongly) disagree. Furthermore, about 20% of the respondents appears to be indifferent.

These findings suggest that while a significant number of respondents feel that there is enough information available for them to make a decision about performing a radon test at home, there is still a considerable proportion of individuals who are uncertain or feel uninformed about this matter.

Table 35: Information Comprehensiveness.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA30 I don't feel well informed about which actions are needed related to indoor radon levels.	1953	1	5	3.79	.939
RA31 There is enough information for me to decide whether I should perform a radon test at home.	1866	1	5	2.82	1.044

Table 36: Information Comprehensiveness scale.

Information comprehensiveness scale Items	RA30 I don't feel well informed about which actions are needed related to indoor radon levels.	RA31 There is enough information for me to decide whether I should perform a radon test at home.
RA30 I don't feel well informed about which actions are needed related to indoor radon levels.	-	-.281 <.001

The **information comprehensiveness scale** was assessed using a two-items. Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the information comprehensiveness scale. This revealed that there is no single factor that could explain this, as well the factor did not load significantly. Therefore, a correlation table was constructed. With this table it can be noticed that there is only a low correlation between the two items (-.281).

4.25 Information uncertainty

Information uncertainty

Some respondents have expressed that the information regarding the health effects of radon remains too uncertain for them to take decisive actions. The majority of respondents, however, maintain a neutral stance on the statement that 'Information about the health effects of radon is still too uncertain to act upon.'

Participants were asked to rate their level of agreement on the following statement: “Information about the health effect of radon is still too uncertain to take actions based on it.” The item was rated on a 5-point Likert scale, ranging from 1 (completely disagree) to 5 (completely agree). There are N=1809 valid responses collected. For this item the mean is 3.08 with a standard deviation of .980

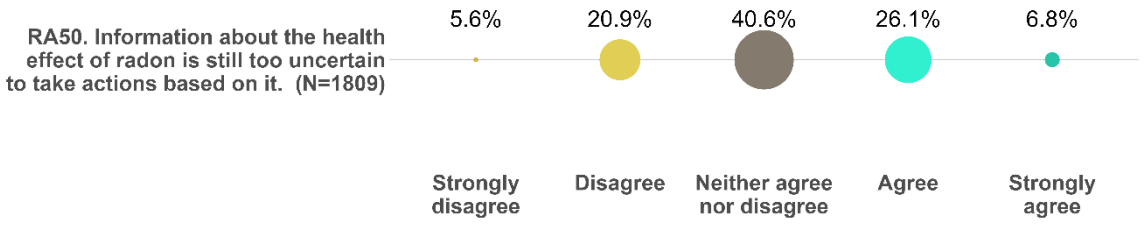


Figure 80: Information uncertainty. (N = 2012), unweighted sample.

The question tries to get more information on whether the information on the health effects of radon that is currently available for the respondents is enough for them to take action. It gives an indication on how uncertainty is handled. Looking at the graph the largest group (40.6%) indicate that they neither agree nor disagree with the statement. Further, 26.1% agree with the information uncertainty as driver to not act, while 20.9% disagree. On the outer answers there are 6.8% of the respondents that strongly

disagree and only 5.6% that strongly disagree. This graph shows that either the respondents is undecidable or agrees on having to much uncertainty on health effect information about radon.

4.26 Affective response to information

Affective response to information

In the field of communication science, the term "affective response to information" refers to the emotional or feeling-based reactions and attitudes that individuals experience when they receive and process information through various communication channels. This concept acknowledges that communication is not solely about the transmission of facts and data but also involves the elicitation of emotional reactions in the audience.

The findings indicate that information pertaining to radon does not elicit strong emotional responses among the respondents. The majority of individuals tend to remain neutral when it comes to feelings of concern or nervousness regarding the potential impact of radon-related information.

Furthermore, the results demonstrate a clear relationship between emotional responses to radon-related information and the intention to take protective measures. Specifically, a stronger emotional reaction to information about radon corresponds to a higher likelihood that respondents express the intention to conduct radon testing or engage in mitigation efforts.

In the field of communication science, the term "affective response to information" refers to the emotional or feeling-based reactions and attitudes that individuals experience when they receive and process information through various communication channels. This concept acknowledges that communication is not solely about the transmission of facts and data but also involves the elicitation of emotional reactions in the audience.

Respondens were asked to express their level of agreement with the the following two questions: “Information about radon makes me worry.”; “Information about radon makes me nervous.”. on the scale from (1) “Strongly Disagree” to (5) “Strongly Agree”.

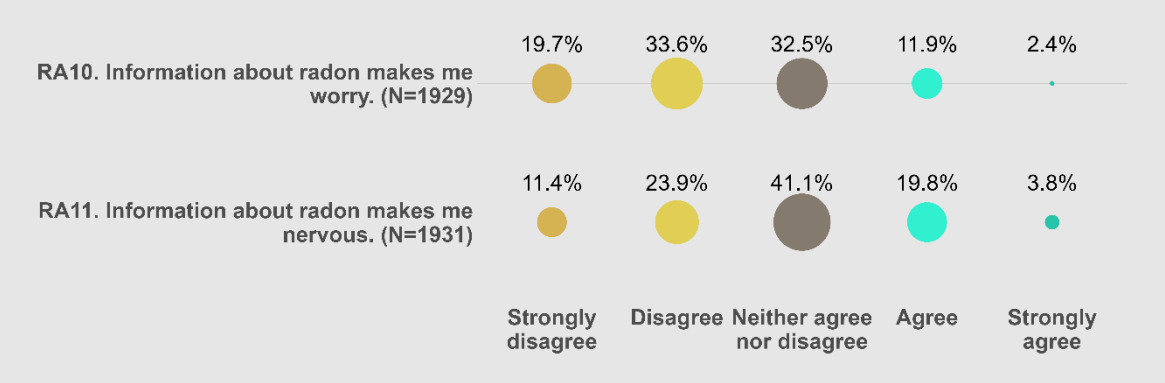


Figure 81: Affective response to information.

The figure 81 shows that 33.6% of the respondents indicated that they disagree on getting worry about information on radon, while 32.5% chose neither agree nor disagree. 19.7% said they strongly disagree and 11.9% agree. Only a very small fraction 2.4% declare that they are strongly agree on getting worry about radon information.

In comparison, on the second question 41.1% expressed themselves as neither agree nor disagree on getting nervous about information on radon. 23.9% indicated that they disagree, whereas 19.8% agreed. 11.4% declared that they strongly disagree with getting nervous on information about radon. Also here the smallest fraction goes to strongly agree (3.8%).

Table 37: Descriptive statistics, affective response to information.

Item	N (2012)	Minimum	Maximum	Mean	Std. Deviation
RA10 Information about radon makes me worry.	1929	1	5	2.81	1.004
RA11 Information about radon makes me nervous.	1931	1	5	2.44	1.012

Table 38: Affective response to information scale.

Affective response to information scale Items	General population Factor loading Principal axis	Radon risk population Factor loading Principal axis	General population Cronbach's Alpha N out of 2012 (%)	Radon risk population Cronbach's Alpha, N out of 453 (%)
RA10 Information about radon makes me worry.	.821	.789	.806 N=1910 (94.9%) 67%	.769 N=429(94.7%) 62%
RA11 Information about radon makes me nervous.	.821	.789		

The **affective response to information scale** was assessed using a two-items. Principal axis factoring (no rotation) was performed to explore the underlying factor structure of the affective response to information scale. The analysis revealed a single factor, which accounted for 67% of the total variance (N=1910 out of 2012). All two items loaded significantly on the factor (factor loadings: .821), indicating that they shared a common underlying factor. The internal consistency of the scale was found to be high, with a Cronbach's alpha coefficient of .806, indicating good reliability. The factorial validity of the Intention to protect from radon scale was further confirmed in a sample of individuals living in medium or high radon risk area (N=453). Similar to the original sample, the factor analysis with principal axis factoring showed a single factor solution, explaining 62% of the total variance. All two items loaded significantly on the factor (factor loadings: .789), indicating that the factor structure was consistent across both samples. Internal consistency of the scale was also found to be high in this population, with a Cronbach's alpha coefficient of .769, indicating good reliability.

Furthermore, the results demonstrate a clear relationship between emotional responses to radon-related information and the intention to take protective measures. Specifically, a stronger emotional reaction to information about radon corresponds to a higher likelihood that respondents express the intention to conduct radon testing or engage in mitigation efforts.

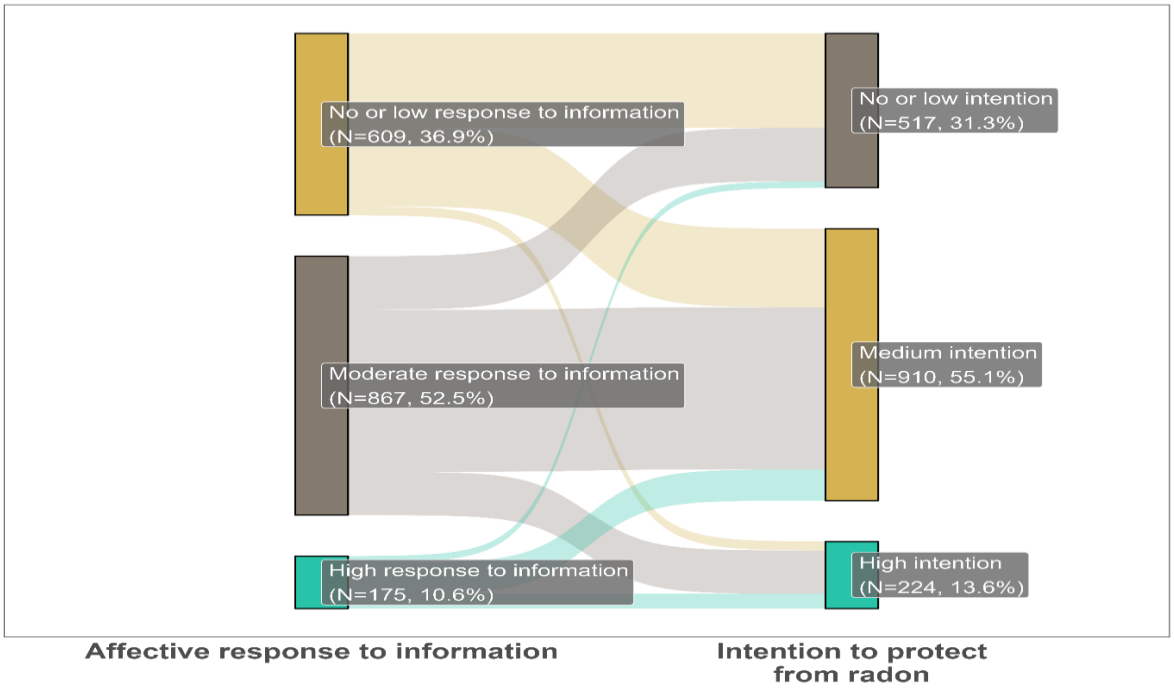


Figure 82: Affective response to information and intention to protect from radon.

4.27 Preference for post-survey radon related information

Preference for post-survey radon related information

As anticipated, the majority of respondents have shown limited interest in seeking further information concerning radon. However, among those who express a willingness to receive additional radon-related information, the preferred communication channels are television, radio, and newspapers, followed by printed leaflets and personalized information letters. Approximately 16% of the respondents have indicated a preference for obtaining information through school resources or social media as alternative communication channels.

In order to identify a respondent's preferred communicaiton chanel, the the following question has been asked: "Which information channel would be the most appropriate for you, to receive more information about radon?". Respondents were able to answer using multiple options. As a result of this, the percentage of each answer option should be viewed on its own as all the options together does not sum to 100%. The following 13 categories were possible to choose from to answer this construct: " (1) "I am not interested in more information about radon." ; (2) "Television" ; (3) "Radio" ; (4) "Newspaper" ; (5) "Leaflet" ; (6) "Personalized information letter" (7) "Information from the school" ; (8) "Social Media" ; (9) "Meeting with the local community" ; (10) "Phone" ; (11) "Email" ; (12) "Other (open)" ; (99) "I don't know/NA".

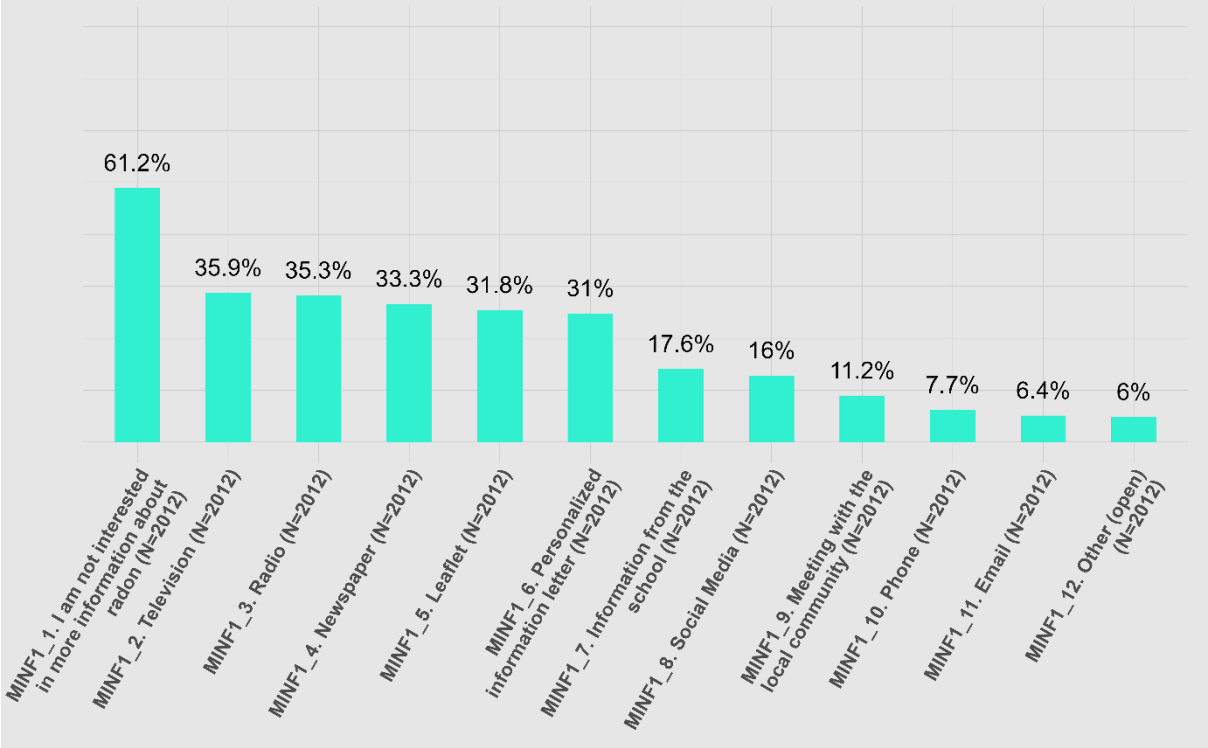


Figure 83: Preference for post-survey radon information

The figure shows respondents' preferences for post-survey radon information. Results show, that there is a high percentage of the respondents that indicated that they are not interested in information about radon (61.2%). Following on this the more convenient types of sharing data is preferred by these respondents being first television (35.9%), radio (35.3%) and newspaper (33.3%). Other options that are also preferred are leaflet (31.8%) and personalized information letter (31%). 17.6% of the respondents would like to be informed through information from the school, while 16% prefers social media as a communicaiton channel. Only a small fraction indicated a meeting with the local community (11.2%), info via phone (7.7%) of email (6.4%).

Appendix A. Questionnaire: English, Slovenian version

Dear Participant,
This research seeks to chart the attitudes, beliefs and perception in society related to health behaviour in the context of the European research project RadoNorm.
The survey is anonymous and voluntary. Your name will not appear or be used in any stage of data collection or analysis. You may refuse to answer any question or withdraw at any stage. The information you provide will be used only for this survey and will be held anonymously and confidentially. In keeping with the General Data Protection Regulation (GDPR) all participant data will be destroyed as soon as analysis of the data is complete.
Please read the following statements before consenting to participate in the survey.
• I have read and understood the information above.
• I understand what the project is about, and what the results will be used for.
• I know that my participation is voluntary and that I can withdraw from the project at any stage without giving any reason.
• I am aware that my information and answers will be kept confidential.

Having read the information above, do you consent to participate in this survey?

- Yes I consent
- No I do not consent → Stop interview

Αγαπητέ Συμμετέχοντα,

Όπως αναφέρεται στην επιστολή πρόσκλησης, η έρευνα αυτή επιδιώκει να καταγράψει τις στάσεις, τις πεποιθήσεις και τις αντιλήψεις της κοινωνίας σχετικά με τη συμπεριφορά υγείας.

Το όνομά σας δεν θα χρησιμοποιηθεί σε κανένα στάδιο των δεδομένων. Μπορείτε να αρνηθείτε να απαντήσετε σε οποιαδήποτε ερώτηση ή να αποσυρθείτε σε οποιοδήποτε στάδιο. Οι πληροφορίες που παρέχονται θα χρησιμοποιηθούν μόνο για την παρούσα έρευνα και θα τηρούνται ανώνυμα και εμπιστευτικά. Σύμφωνα με τον Γενικό Κανονισμό για την Προστασίας Δεδομένων (GDPR), όλα τα δεδομένα των συμμετεχόντων θα καταστραφούν αμέσως μετά την οριστικοποιηση του συνόλου των δεδομένων.

Διαβάστε τις ακόλουθες δηλώσεις πριν συναινέσετε να συμμετάσχετε στην έρευνα.

• Έχω διαβάσει και κατανοήσει την επιστολή πρόσκλησης.

• Καταλαβαίνω τι αφορά η μελέτη και για ποιον σκοπό θα χρησιμοποιηθούν τα αποτελέσματα.

• Γνωρίζω ότι η συμμετοχή μου είναι εθελοντική και ότι μπορώ να αποχωρήσω από την έρευνα σε οποιοδήποτε στάδιο χωρίς να δώσω καμία αιτιολογία.

• Γνωρίζω ότι οι πληροφορίες και οι απαντήσεις μου θα τηρηθούν εμπιστευτικά.

Έχοντας διαβάσει τις παραπάνω πληροφορίες, συναινείτε να συμμετάσχετε στην παρούσα έρευνα;

(Ο συμμετέχων πρέπει να δώσει αυτήν την απάντηση στο πρώτο σημείο του ερωτηματολογίου).

Ερωτηματολόγιο

info Namen te raziskave, ki se izvaja v okviru evropskega raziskovalnega projekta RadoNorm, je prikazati stališča, prepričanja in zaznavanje tveganj v družbi.

Vaše ime ne bo uporabljeno v nobeni fazi obdelave podatkov. V katerikoli fazi lahko zavrnete odgovor na katero koli vprašanje ali prenehate z reševanjem ankete. Podatki, ki jih boste posredovali, bodo uporabljeni samo za to raziskavo ter bodo hranjeni anonimno in zaupno. V skladu s Splošno uredbo o varstvu podatkov (GDPR) bodo vsi podatki o udeležencih uničeni takoj, ko bo nabor podatkov končan.

$soglasje==2 ==> nezeli

soglasje Preden se strinjate s sodelovanjem v raziskavi, preberite naslednje izjave.

- Prebral-a sem informacije o raziskavi in jih razumem.
- Razumem namen projekta in kako bodo uporabljeni rezultati.
- Razumem, da je moje sodelovanje prostovoljno in da lahko v kateri koli fazi odstopim od projekta brez navedbe razloga.
- Zavedam se, da bodo moji podatki in odgovori zaupni.

Ali po prebranih informacijah soglašate s sodelovanjem v tej raziskavi?

1 da
2 ne

INTRO:

First we want to ask some questions about you.

ΕΙΣΑΓΩΓΗ:

Πρώτα θα θέλαμε να κάνουμε μερικές ερωτήσεις για εσάς.

Najprej vam želimo zastaviti nekaj vprašanj o vas.

S2	What best describes your gender? Φύλο(?); Prosimo označite vaš spol	1. Male 2. Female 3. Other 4. I prefer not to say 1. Άνδρας 2. Γυναίκα 3. Άλλο 4. ΔΞ/ΔΑ 1 Moški 2 Ženski 3 Drugo 4 Ne želim odgovoriti
S3	What is your place of residence? Τόπος κατοικίας Podatek pridobljen iz panela Mediane.	…. [Eircode] [Δήμος, ταχυδρομικός κώδικας]

S4	What year were you born in? Έτος γέννησης Podatek pridobljen iz panela Mediane.	.... [year] .... [έτος]
S5	What is the highest level of education/training you have obtained? Ποιο είναι το υψηλότερο δίπλωμα που έχετε αποκτήσει (ποιο είναι το μορφωτικό σας επίπεδο); Najvišja stopnja zaključene izobrazbe?	1. Primary school leaving certificate 2. High school/high school diploma 3. Degree of HEI/TEI/IEK 4. Postgraduate 5. Ph.D 9. NA 1. Απολυτήριο δημοτικού 2. Απολυτήριο γυμνασίου/λυκείου 3. Πτυχίο ΑΕΙ/ΤΕΙ/ΙΕΚ 4. Μεταπτυχιακό 5. Διδακτορικό 6. ΔΞ/ΔΑ 1 nedokončana osnovna šola 2 dokončana osnovna šola 3 dokončana 2,3-letna poklicna šola 4 dokončana 4-letna srednja šola 5 dokončana 2,3-letna višja šola 6 dokončana visoka šola, fakulteta ali več 9 *ne vem, ne želim odgovoriti*
S7	How many people are currently living in your household (including yourself)? Children living in student accommodation who come home during the weekend also count as a household member. Πόσα μέλη της οικογένειάς σας ζουν σήμερα στο νοικοκυριό σας (συμπεριλαμβανομένου του εαυτού σας); Τα παιδιά που ζουν σε φοιτητική εστία και επιστρέφουν στο σπίτι κατά τη διάρκεια του Σαββατοκύριακου υπολογίζονται επίσης ως μέλος του νοικοκυριού.	

	Vprašanje je bilo v Sloveniji izključeno.	
S8	And how many of those are children younger than 18? Και πόσα από αυτά είναι παιδιά κάτω των 18; Vprašanje je bilo v Sloveniji izključeno.	
S10	Is the dwelling that you spend most of your time a property of yours or your family, or does it belong to someone else? Η κατοικία στην οποία περνάτε τον περισσότερο χρόνο σας είναι ιδιοκτησία δική σας ή της οικογένειάς σας ή ανήκει σε κάποιον άλλο; Ali je bivališče, v katerem preživite večino svojega časa, vaša last ali last vaše družine ali je v lasti nekoga drugega?	1. I am owner or co-owner 2. It is the property of another family member 3. It is the property of someone else 9. Don't know/ NA 1. Είμαι ιδιοκτήτης ή συνιδιοκτήτης 2. Είναι ιδιοκτησία άλλου μέλους της οικογένειας 3. Είναι ιδιοκτησία κάποιου άλλου 9. ΔΞ/ΔΑ 1 Sem lastnik ali solastnik 2 Je last drugega družinskega člana 3 Je last nekoga drugega 9 *Ne vem / brez odgovora*
S11	For how long have you been living in this dwelling? Πόσο καιρό ζείτε σε αυτή την κατοικία; Koliko časa živite v tem bivališču?	1. 1 year or less 2. More than one year : (Indicate in years) 1. Λιγότερο από 1 έτος 2. Πάνω από ένα έτος : (Να αναφέρεται σε έτη) 1 Manj kot 1 leto 2 Več kot eno leto (navedite v letih):

S110	Years living in this dwelling Vprašanje je bilo v Sloveniji izključeno.	open
DWEL1	In approximately which year was the dwelling you live in built? Ποια χρονιά, περίπου, χτίστηκε η κατοικία στην οποία ζείτε; Približno v katerem letu je bilo zgrajeno bivališče v katerem živite? Max. answer depends on S11: max=2023-(S11) where S11 = 1 for code 1	… [year] 9. I don't know … [έτος] Ne vem 1 zgrajeno je bilo leta...
DWEL2	For surveys conducted in 2023: filter on DWL1=2012 or less (DWEL1 is older than 10 years): Was the dwelling renovated for energy-saving purposes (e.g. insulation, windows, …)? ΑΝ το οίκημα είναι παλαιότερο των 10 ετών: Ανακαινίστηκε η κατοικία για λόγους εξοικονόμησης ενέργειας (π.χ. μόνωση, παράθυρα,…) Ali je bilo bivališče prenovljeno z namenom varčevanja z energijo (npr. izolacija, okna ...)?	1. Yes 2. No 9. I don't know/NA 1. Ναι 2. Όχι 9. ΔΞ/ΔΑ 1 Da 2 Ne 9 *Ne vem / brez odgovora*
DWEL3	In what type of dwelling do you live? Σε τι είδους κατοικία μένετε; V kakšni vrsti bivališča živite?	1. Studio/Apartment 2. Detached House 3. Semi-detached House 4. Terraced House 5. Other 1. Διαμέρισμα στούντιο 2. Μονοκατοικία 3. Ημιμονοκατοικία 4. Μεζονέτα

		5. Αλλα 1 Garsonjera / stanovanje 2 Samostojna hiša 3 Večstanovanjska hiša 4 Vrstna hiša 5 Pritlična hiša
DWEL4	Is the ground floor or basement in your dwelling used as a living space? Χρησιμοποιείται το ισόγειο ή το υπόγειο της κατοικίας σας ως χώρος διαβίωσης; Ali se klet oziroma, če nimate kleti, pritličje uporablja kot bivalni prostor?	1. Yes 2. No 9. I don't know/ NA 1. Ναι 2. Όχι 3. ΔΞ/ΔΑ 1 Da 2 Ne 9 *Ne vem / brez odgovora*
SMOKE	Do you or anyone else in your home smoke indoors? Καπνίζετε εσείς ή κάποιος άλλος στο σπίτι σας σε εσωτερικούς χώρους; Ali vi ali kdo drug v vašem domu kadite v zaprtih prostorih?	1. Ναί 2. Όχι 3. ΔΞ/ΔΑ 1 Da 2 Ne 3 *Brez odgovora*

INTRO:

Now we will continue with some general questions.

To what extent do you agree or disagree with the following statements?

ΕΙΣΑΓΩΓΗ: *Τώρα θα συνεχίσουμε με κάποιες γενικές ερωτήσεις. Σε ποιο βαθμό συμφωνείτε ή διαφωνείτε με τις ακόλουθες δηλώσεις;*

Nadaljevali bomo z nekaterimi splošnimi vprašanji.
V kolikšni meri se strinjate ali ne strinjate z naslednjimi trditvami? Vsako izmed trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

Response Style: Interpersonal Reactivity Index RANDOMISE *(don't show this title to respondents)*		
E1	I often have tender, concerned feelings for people who are less fortunate than I. Συχνά ανησυχώ για ανθρώπους που είναι λιγότερο τυχεροί από εμένα. Pogosto me skrbi za ljudi, ki imajo manj sreče, kot jaz.	1.Completely disagree 2.Disagree 3.Neutral 4. Agree 5. Completely agree 9. I don't know/NA
E2	I sometimes find it difficult to see things from another person's point of view. Μερικές φορές δυσκολεύομαι να δω τα πράγματα από την οπτική γωνία ενός άλλου ατόμου. Včasih težko vidim stvari s stališča druge osebe.	
E3	Sometimes I don't have much compassion for other people when they have problems. Μερικές φορές δεν έχω πολλή συμπόνια για τους άλλους ανθρώπους όταν έχουν προβλήματα. Včasih **nimam** veliko sočutja do drugih ljudi, ko imajo težave.	1. Διαφωνώ εντελώς 2. Διαφωνώ 3.Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ
E4	I try to look at everybody's side of a disagreement before I make a decision. Προσπαθώ να κοιτάξω την πλευρά όλων σε μια διαφωνία πριν πάρω μια απόφαση. Preden sprejmem odločitev, poskušam preučiti stališča vseh udeleženih v sporu.	1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
E5	Other people's misfortunes do not usually disturb me a great deal. Οι ατυχίες των άλλων ανθρώπων συνήθως δεν με ενοχλούν ιδιαίτερα. Nesreče drugih ljudi me običajno ne vznemirjajo preveč.	
E6	I am often quite touched by things that I see happen. Συχνά συγκινούμαι από πράγματα που βλέπω να συμβαίνουν. Pogosto se me stvari, ki jih vidim, zelo dotaknejo.	
E7	I believe there are two sides to every question and try to look at them both. Πιστεύω ότι κάθε ερώτηση έχει δύο πλευρές και προσπαθώ να τις εξετάσω και τις δύο.	

	Verjamem, da ima vsako vprašanje dve plati, zato poskušam preučiti obe.	
E8	Before criticizing somebody, I try to imagine how I would feel if I were in their place. Πριν ασκήσω κριτική σε κάποιον, προσπαθώ να φανταστώ πώς θα ένιωθα αν ήμουν στη θέση του. Preden nekoga kritiziram, si poskušam predstavljati, kako bi se sam-a počutil-a na njegovem mestu.	

INTRO:

How do you perceive the potential risk to your health within the next 20 years from each of the following sources?

ΕΙΣΑΓΩΓΗ: Πώς αντιλαμβάνεστε τον δυνητικό κίνδυνο για την υγεία σας μέσα στα επόμενα 20 χρόνια από καθεμία από τις ακόλουθες πηγές;

Kako ocenjujete potencialno tveganje za svoje zdravje v naslednjih 20 letih zaradi vsakega od naslednjih dejavnikov? Prosimo, da tveganje za vsakega od sledečih dejavnikov ocenite na lestvici od 1 (nobenega tveganja) do 6 (zelo visoko tveganje).

Risk Perceptions RANDOMISE *(don't show this title to respondents)*		
RP1	Environmental pollution Μόλυνση/ρύπανση του περιβάλλοντος Onesnaženost okolja	1. No risk at all 2. Very low 3. Low 4. Moderate 5. High 6. Very high 9. I don't know/NA
RP2	Radioactive waste Ραδιενεργά απόβλητα Radioaktivni odpadki	
RPgr1	Radiation from mobile phones Ακτινοβολίες από κινητά τηλέφωνα Vprašanje je bilo v Sloveniji izključeno.	1. Κανένας κίνδυνος 2. Πολύ χαμηλός 3. Χαμηλός
RPgr2	Mobile phone antennas Κεραίες κινητής τηλεφωνίας Vprašanje je bilo v Sloveniji izključeno.	4. Μέτριος 5. Υψηλός 6. Πολύ υψηλός
RP5	An accident at a nuclear installation Nesreča v jedrski elektrarni Krško	7. ΔΞ/ΔΑ

RP6	Natural radiation (from the soil or from space) Φυσική ακτινοβολία (από το έδαφος ή από το διάστημα) Naravno sevanje (iz tal ali vesolja)	1. nobenega tveganja 2. zelo nizko tveganje 3. nizko 4. zmerno 5. visoko 6. zelo visoko 7. ne vem/brez odgovora
RP7	The use of ionizing radiation for medical tests or treatments Η χρήση ιοντίζουσας ακτινοβολίας για ιατρικές εξετάσεις ή θεραπείες Uporaba ionizirajočega sevanja pri medicinskih preiskavah ali zdravljenju	
RPgr3	5G systems Συστήματα 5G Vprašanje je bilo v Sloveniji izključeno.	
RP11	Climate crisis Κλιματική κρίση (αλλαγή?) Podnebna kriza	
RP12a	SPLIT BALLOT (50% or respondents): Indoor air pollution due to radon ρύπανση του εσωτερικού αέρα λόγω ραδονίου Onesnaženost zraka v zaprtih prostorih zaradi radona	
RP12b	SPLIT BALLOT (50% or respondents): The presence of the naturally radioactive gas radon indoors παρουσία του φυσικούά ραδιενεργού αερίου ραδονίου σε εσωτερικούς χώρους Prisotnost naravno radioaktivnega plina radona v zaprtih prostorih	
RP20	Using recycled building material with low levels of radioactivity Χρήση ανακυκλωμένων δομικών υλικών με χαμηλά επίπεδα ραδιενέργειας Uporaba recikliranega gradbenega materiala z nizko stopnjo radioaktivnosti	

INTRO:

How much confidence do you have in the authorities for the actions they undertake to protect the population against risks from each of the following sources?

ΕΙΣΑΓΩΓΗ: Πόση εμπιστοσύνη έχετε στις αρχές για τις δράσεις που αναλαμβάνουν για την προστασία του πληθυσμού από κινδύνους που προέρχονται από καθεμία από τις ακόλουθες πηγές;

Koliko zaupate državnim organom glede ukrepov, ki jih izvajajo za zaščito prebivalstva pred tveganji za vsakega od naslednjih dejavnikov. Prosimo, da zaupanje za vsakega od dejavnikov ocenite na lestvici od 1 (nimam zaupanja) do 6 (zelo veliko zaupam).

Confidence in Authorities RANDOMISE *(don't show this title to respondents)*		
RC1	Environmental pollution Μόλυνση/ρύπανση του περιβάλλοντος Onesnaženost okolja	1. No risk at all 2. Very low 3. Low 4. Moderate 5. High 6. Very high 9. I don't know/NA 1. Κανένας κίνδυνος 2. Πολύ χαμηλός 3. Χαμηλός 4. Μέτριος 5. Υψηλός 6. Πολύ υψηλός 7. ΔΞ/ΔΑ 1. Nimam zaupanja 2. Zelo malo zaupam 3. Malo zaupam 4. Zmerno zaupam 5. Precej zaupam 6. Zelo veliko zaupam 7. ne vem/brez odgovora
RC2	Radioactive waste Ραδιενεργά απόβλητα Radioaktivni odpadki	
RCgr1	Radiation from mobile phones Ακτινοβολίες από κινητά τηλέφωνα Vprašanje je bilo v Sloveniji izključeno.	
RCgr2	Mobile phone antennas Κεραίες κινητής τηλεφωνίας Vprašanje je bilo v Sloveniji izključeno.	
RC5	Nesreča v jedrski elektrarni Krško	
RC6	Natural radiation (from the soil or from space) Φυσική ακτινοβολία (από το έδαφος ή από το διάστημα) Naravno sevanje (iz tal ali vesolja)	
RC7	The use of ionizing radiation for medical tests or treatments Η χρήση ιοντίζουσας ακτινοβολίας για ιατρικές εξετάσεις ή θεραπείες Uporaba ionizirajočega sevanja pri medicinskih pregledih ali zdravljenju	
RCgr3	5G systems Συστήματα 5G	

	Vprašanje je bilo v Sloveniji izključeno.	
RC11	Climate crisis Κλιματική κρίση (αλλαγή?) Podnebna kriza	
RC12a	SPLIT BALLOT (50% or respondents): Indoor air pollution due to radon ρύπανση του εσωτερικού αέρα λόγω ραδονίου Onesnaženost zraka v zaprtih prostorih zaradi radona	
RC12b	SPLIT BALLOT (50% or respondents): The presence of the naturally radioactive gas radon indoors παρουσία του φυσικούά ραδιενεργού αερίου ραδονίου σε εσωτερικούς χώρους Prisotnost naravno radioaktivnega plina radona v zaprtih prostorih	
RC20	Using recycled building material with low levels of radioactivity Χρήση ανακυκλωμένων δομικών υλικών με χαμηλά επίπεδα ραδιενέργειας Uporaba recikliranega gradbenega materiala z nizko stopnjo radioaktivnosti	

INTRO:

Now we are interested to hear what you think about the following issues:

ΕΙΣΑΓΩΓΗ: Τώρα μας ενδιαφέρει να ακούσουμε τη γνώμη σας για τα ακόλουθα θέματα:

Radon Awareness/ Salience *(don't show this title to respondents)*		
RA1	Do you know anything about radon? Γνωρίζετε τι είναι το ραδόνιο; Ali veste kaj o radonu?	1.Yes 2. I have heard something about it 3. No 9. I don't know/NA 1.Ναι 2. Έχω ακούσει κάτι σχετικά με

		αυτό 3. Όχι 4. ΔΞ/ΔΑ 1 Da 2 Nekaj sem že slišal o radonu 3 Ne 9 *Ne vem / brez odgovora*
SALI1	Radon may be a problem, but I haven't paid much attention to it because there are more important things to deal with. Δεν έχω δώσει μεγάλη προσοχή στο ραδόνιο γιατί υπάρχουν πιο σημαντικά πράγματα που πρέπει να αντιμετωπίσω. Prosimo, ocenite, v kolikšni meri se strinjate s sledečo trditvijo: Radon je lahko problem, vendar se mu nisem veliko posvečal-a, ker so pomembnejše stvari s katerimi se je treba ukvarjati.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. Έντονα Διαφωνώ 2. Διαφωνώ 3. Ούτε συμφωνώ , ούτε διαφωνώ 4. Συμφωνώ 5. Έντονα Συμφωνώ 6. ΔΞ/ΔΑ 1 Sploh se ne strinjam 2 Ne strinjam se 3 Niti se ne strinjam, niti se strinjam 4 Strinjam se 5 Popolnoma se strinjam 9 *Ne vem / brez odgovora*
RA1bis	IF RA1 = 1 or 2: Can you describe in a few words what you have heard about radon? AN RA1 = 1 ή 2 : Μπορείτε να περιγράψετε με λίγα λόγια τι έχετε ακούσει για το ραδόνιο; Ali lahko v nekaj besedah opišete kaj ste slišali o radonu? Prosimo vas, da resnično navedete le	… [Open] … [Ανοιξε] … [odprto]

	tisto, kar o radonu že veste, ter ne uporabljate spletnih brskalnikov ali drugih virov informacij.	
RA1a	How confident are you in your knowledge related to radon? Πόσο σίγουροι είστε για τις γνώσεις σας σχετικά με το ραδόνιο; Kako prepričani ste v svoje znanje o radonu?	1. Not at all confident 2. Somewhat confident 3. Moderately confident 4. Quite confident 5. Highly confident 1. Καθόλου σίγουρος 2. Λίγο σίγουρος 3. Μέτρια αυτοπεποίθηση 4. Αρκετή αυτοπεποίθηση 5. Μεγάλη αυτοπεποίθηση 1 Sploh nisem prepričan 2 Nekoliko prepričan 3 Zmerno prepričan 4 Precej prepričan 5 Zelo prepričan

INTRO IF RA1 = 1 or 2:

Do you agree or disagree with the following statements?

ΕΙΣΑΓΩΓΗ ΑΝ RA1 = 1 ή 2: Συμφωνείτε ή διαφωνείτε με τις παρακάτω δηλώσεις;

Ali se s sledečimi trditvami o radonu strinjate ali ne strinjate?

Radon Knowledge (RANDOMISED) *(don't show this title to respondents)*		
AW37	Radon causes headaches. Το ραδόνιο προκαλεί πονοκεφάλους. Radon povzroča glavobol.	1. Agree 2. Disagree 9. I don't know/NA

AW38	Radon exposure is linked to lung cancer. Η έκθεση στο ραδόνιο συνδέεται με καρκίνο του πνεύμονα. Izpostavljenost radonu je povezana s pljučnim rakom	1. Συμφωνώ 2. Διαφωνώ 9. ΔΞ/ΔΑ 1.strinjam se 2.ne strinjam se 9.ne vem/brez odgovora
AW39	Radon is a radioactive liquid. Το ραδόνιο είναι ένα ραδιενεργό υγρό. Radon je radioaktivna tekočina.	
AW40	Radon has a strong odor. Το ραδόνιο έχει έντονη οσμή. Radon ima močan vonj.	
AW41	Radon is invisible. Το ραδόνιο είναι αόρατο. Radon je neviden.	
AW42	Radon levels are usually higher in the attic than the basement. Τα επίπεδα ραδονίου είναι συνήθως υψηλότερα στη σοφίτα από ότι στο υπόγειο. Vsebnost radona je običajno višja na podstrešju kot v kleti.	
AW43	Testing is the only way to determine if a home has an elevated radon level. Η μέτρηση είναι ο μόνος τρόπος για να διαπιστωθεί εάν ένα σπίτι έχει αυξημένα επίπεδα ραδονίου. Merjenje je edini način, kako ugotoviti, ali je koncentracija radona v domu povišana.	
AW44	Radon can enter homes through cracks in walls and floors. Το ραδόνιο μπορεί να εισέλθει στα σπίτια μέσω ρωγμών στους τοίχους και τα δάπεδα. Radon lahko vstopi v domove skozi razpoke v stenah in tleh.	1. Agree 2. Disagree 9. I don't know/NA
		1. Συμφωνώ 2. Διαφωνώ 9. ΔΞ/ΔΑ
AW46	The risks from radon exposure increase the longer you are exposed to it. Ο κίνδυνος από την έκθεση στο ραδόνιο αυξάνεται όσο περισσότερο εκτίθεστε σε αυτό.	

	Tveganje zaradi izpostavljenosti radonu se veča s trajanjem izpostavljenosti.	1.strinjam se 2.ne strinjam se 9.ne vem/brez odgovora
AW48	Concentrations of indoor radon are expressed in Watt. Η συγκέντρωση του ραδονίου στους εσωτερικού χώρου εκφράζεται σε Watt. Tveganje zaradi izpostavljenosti radonu se veča s trajanjem izpostavljenosti.	
General knowledge *(don't show this title to respondents)* **ALL (no filter) RANDOMISE** **INTRO:** ***Do you agree or disagree with the following statements?*** **Γενικές γνώσεις** *(μην εμφανίζεται αυτός ο τίτλος στους ερωτηθέντες)* **ΟΛΑ (χωρίς φίλτρο) ΤΥΧΑΙΑ** Ali se s sledečimi trditvami o radonu strinjate ali ne strinjate? **ΕΙΣΑΓΩΓΗ:** ***Συμφωνείτε ή διαφωνείτε με τις παρακάτω δηλώσεις;***		
AW47	Exposure to radiation always leads to radioactive contamination. Η έκθεση σε ακτινοβολία οδηγεί πάντα σε ραδιενεργή μόλυνση/ρύπανση. Izpostavljenost sevanju vedno povzroči radioaktivno kontaminacijo.	
AW17	The human body is naturally radioactive. Το ανθρώπινο σώμα είναι φυσικά ραδιενεργό. Človeško telo je naravno radioaktivno.	
AW18	With time, every radioactive substance becomes more and more radioactive. Με την πάροδο του χρόνου, κάθε ραδιενεργή ουσία γίνεται όλο και πιο ραδιενεργή. Vsaka radioaktivna snov sčasoma postane vse bolj radioaktivna.	

VIDEO	IF RA1 = 3 or 9 and if 1 or 2 less than 6 statements correct from AW37 to AW48 correct: ***Show video related to Radon:*** ***INTRO:***

	We would like to show you a short video. Please, turn on your sound and watch it. AN RA1 = 3 ή 9 και αν 1 ή 2 λιγότερες από 6 προτάσεις είναι σωστές από AW37 σε AW48 σωστές: ***Προβολή βίντεο σχετικά με το ραδόνιο:*** ***ΕΙΣΑΓΩΓΗ: Θα θέλαμε να σας δείξουμε ένα σύντομο βίντεο. Παρακαλώ, ενεργοποιήστε τον ήχο σας και παρακολουθήστε τον.*** **VIDEO** Radi bi vam pokazali kratek videoposnetek. Vklopite zvok in si ga oglejte.
INTRO	*INTRO for all* *Before we continue with the questionnaire we point out that a building can be tested for radon; it can be remediated if there is radon detected; or there can be preliminary protective measures installed when the building is built. We would like to ask you to share your opinion on this matter.* *ΕΙΣΑΓΩΓΗ για όλους* ***Πριν συνεχίσουμε με το ερωτηματολόγιο, επισημαίνουμε ότι, ένα κτίριο μπορεί να ελεγχθεί για ραδόνιο - μπορεί να αποκατασταθεί εάν ανιχνευθεί ραδόνιο ή μπορεί να παρθούν μέτρα προστασίας κατά την κατασκευή του κτιρίου. Θα θέλαμε να σας ζητήσουμε να μοιραστείτε τη γνώμη σας σχετικά με αυτό το θέμα.*** **Intro:** Preden nadaljujemo z vprašalnikom, poudarjamo, da se lahko koncentracija radona v stavbah izmeri, da se jo lahko sanira če se v njej odkrije radon, ali da se ob gradnji stavbe izvedejo predhodni zaščitni ukrepi. Prosimo vas, da nam zaupate svoje mnenje o tej zadevi.

Behavior *(don't show this title to respondents)*

Συμπεριφορά *(μην εμφανίζεται αυτός ο τίτλος στους ερωτηθέντες)*

RA2.1	Have you or has someone else ever tested your current residence for radon? Εσείς ή κάποιος άλλος έχει ποτέ μετρήσει τη συγκέντρωση ραδονίου στην τρέχουσα κατοικία σας; Ali ste vi ali kdo drug že kdaj izmerili koncentracijo radona v sedanjem bivališču?	1. Yes 2. No 9. I don't know/NA 1. Ναι 2. Όχι 9. ΔΞ/ΔΑ 1Da 2Ne

		9Nevem/brez odgovora
RA2.2	FILTER: IF RA2. 1 = 1: Did the test result indicate there is a need to take further action? ΦΙΛΤΡΟ: ΑΝ RA2. 1 = 1 : Το αποτέλεσμα της μέτρησης έδειξε ότι πρέπει να ληφθούν περαιτέρω μέτρα; Ali je rezultat merjenja pokazal, da je treba sprejeti nadaljnje ukrepe?	1. Yes 2. No 9. I don't know/NA 1. Ναι 2. Όχι 9. ΔΞ/ΔΑ 1Da 2Ne 9Nevem/brez odgovora
RA2.4	Have you or has someone else done something to remediate indoor radon in your current residence? Έχετε κάνει ή έχει κάνει κάποιος άλλος κάτι για την αποκατάσταση του ραδονίου εσωτερικού χώρου στην τρέχουσα κατοικία σας; Ali ste vi ali kdo drug kaj storili za odpravo radona v zaprtih prostorih v vašem sedanjem bivališču?	1.Yes, building was remediated after discovering a radon problem 2. Yes, preliminary protective measures were installed when the building was constructed 3. No 9. I don't know/NA 1.Ναι, το κτίριο αποκαταστάθηκε μετά την ανακάλυψη ενός προβλήματος με το ραδόνιο 2. Ναι, εγκαταστάθηκαν προκαταρκτικά μέτρα προστασίας κατά την κατασκευή του κτιρίου 3. Όχι 9. ΔΞ/ΔΑ 1 Da, stavba je bila sanirana po odkritju težav z radonom 2 Da, ob gradnji stavbe so bili nameščeni predhodni zaščitni ukrepi 3 Ne 9 *Ne vem / brez odgovora*
Type of remediation *(don't show this title to respondents)* **Είδος αποκατάστασης** *(μην εμφανίζεται αυτός ο τίτλος στους ερωτηθέντες)*		

RA2.5	FILTER: IF RA2.4 = 1 OR 2 : (multiple answers) Please, indicate all measures that have been applied in your current residence. (multiple answers possible) ΦΙΛΤΡΟ: ΑΝ RA2.4 = 1 Ή 2 : (πολλαπλές απαντήσεις) Παρακαλείστε να αναφέρετε όλα τα μέτρα που έχουν εφαρμοστεί στην τρέχουσα κατοικία σας. Navedite vse ukrepe, ki so bili uporabljeni v vašem sedanjem bivališču. Možnih je več odgovorov.	1. Natural ventilation (e.g. open windows, vents etc.) 2. Ventilation system (forced ventilation system, heat recovery, air-to-air exchange) 3. Air suction installation (drain pipe, wall, sub-slab) 4. Sealing of existing cracks in the walls 5. Radon Membrane 6. Fixing cracks in foundations 7. Other 9. I don't know/NA RANDOMISE ANSWERING CATEGORIES except 7 and 9 1. Φυσικός αερισμός (π.χ. ανοιχτά παράθυρα, αεραγωγοί κ.λπ.) 2. Σύστημα εξαερισμού (σύστημα εξαναγκασμένου αερισμού, ανάκτηση θερμότητας, ανταλλαγή αέρα-αέρα) 3. Εγκατάσταση αναρρόφησης αέρα (σωλήνα αποστράγγισης, τοίχος, υποπλάκα) 4. Σφράγιση υφιστάμενων ρωγμών στους τοίχους 5. Μεμβράνη ραδονίου 6. Διόρθωση ρωγμών σε θεμέλια 7. Άλλο 9. Δεν ξέρω/NA 1 Naravno prezračevanje (npr odprta okna, zračniki itd) 2 Prezračevalni sistem (sistem prisilnega prezračevanja, rekuperacija toplote, izmenjava zraka z zrakom) 3 Instalacija za odsesavanje zraka (odtočna cev, stena, izpod temeljne plošče) 4 Zatesnitev obstoječih razpok v stenah 5 Membrana proti radonu 6 Utrjevanje razpok v temeljih 7 Drugo * 9 *Ne vem / brez odgovora*

Behavior intention *(don't show this title to respondents)*

Πρόθεση συμπεριφοράς *(μην εμφανίζεται αυτός ο τίτλος στους ερωτηθέντες)*

Prosimo, ocenite, v kolikšni meri se strinjate z naslednjimi trditvami. Vsako od trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

RA5	(IF RA2.1=2 or 9 and IF RA2.4 = 3 or 9 = don't ask people that already remediated and/or tested) I intend to **test radon concentrations** in my home if advised. (AN RA2.1=2 ή 9 και IF RA2.4 = 3 ή 9 = μην ρωτάτε άτομα που έχουν ήδη αποκατασταθεί ή/και δοκιμαστεί) Σκοπεύω να μετρήσω **τις συγκεντρώσεις ραδονίου** στο σπίτι μου, εάν μου το προτείνουν. Po nasvetu nameravam opraviti merjenje koncentracije radona v svojem domu.{ **S:** $RA21==2 or $RA21==9 or $RA24==3 or $RA24==9}	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ
RA5.1	(IF RA2.1=2 or 9 and IF RA2.4 = 3 or 9) I intend to **measure radon** in my home as a precaution. (AN RA2.1=2 ή 9 και IF RA2.4 = 3 ή 9) Σκοπεύω να **μετρήσω το ραδόνιο** στο σπίτι μου για προληπτικούς λόγους. Preventivno nameravam izmeriti radon v svojem domu.{ **S:** $RA21==2 or $RA21==9 or $RA24==3 or $RA24==9}	
RA6	(IF RA2.4 = 3 or 9) I intend to start the remediation of my home if advised. (EAN RA2.4 = 3 ή 9) Σκοπεύω να ξεκινήσω την **αποκατάσταση** της κατοικίας μου, εάν μου το υποδείξουν. Po nasvetu nameravam začeti s sanacijo svojega doma.{ **S:** $RA24==3 or $RA24==9}	1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
RA8	(IF RA2.4 = 3 or 9 = only showing to people that have not remediated yet) I would do the necessary to remove radon if I am advised so. (EAN RA2.4 = 3 ή 9 = εμφανίζεται μόνο σε άτομα που δεν έχουν υποστεί αποκατάσταση ακόμα) Θα έκανα ό,τι είναι απαραίτητο για να την μείωση του ραδονίου, αν μου το συνιστούσαν. V Sloveniji je bilo to vprašanje izključeno.	

Can you tell us: Whether you know the following actors from the field of radon?

In your opinion: Are the following actors telling the truth about radon risks?

In your opinion: Are the following actors technically competent with regard to radon mitigation?

Not knowing an actor is a filter for "telling the truth" and "being technically competent"

"x" in first column = don't ask respondents if they know them RANDOMISE

Όταν εξετάζουμε το ραδόνιο, μπορείτε να μας πείτε αν γνωρίζετε τους παρακάτω εμπλεκόμενους φορείς; Εάν ναι, μπορείτε να μας πείτε εάν πιστεύετε ότι λένε την αλήθεια για τους κινδύνους ραδονίου και ότι είναι τεχνικά ικανοί όσον αφορά τον μετριασμό του ραδονίου;

Το να μην γνωρίζεις έναν φορέα είναι ένα φίλτρο για να «λες την αλήθεια» και «να είσαι τεχνικά ικανός»

" x " στην πρώτη στήλη = μην ρωτάτε τους ερωτηθέντες αν τους γνωρίζουν ΤΥΧΑΙΑ

Ξέρετε …

Λένε αλήθεια …

Είναι τεχνικά ικανοί… .

NSTK Ali poznate naslednje deležnike s področja radona? Prosimo, označite vse, ki jih poznate.

NST Ali menite, da sledeči deležniki govorijo resnico o tveganjih zaradi radona? Prosimo, da njihovo resničnost ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

NSC Ali menite, da so sledeči deležniki usposobljeni za izvajanje ukrepov za zmanjšanje radona? Prosimo, da njihovo usposobljenost ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

	NSTK *Know them* *Γνωρίστε τους*	NST *Telling truth* *Λέγοντας την αλήθεια*	*NSC* *Technically competent* *Τεχνικά ικανός*	
1. Public health authorities Αρχές δημόσιας υγείας 1 NIJZ Nacionalni inštitut za javno zdravje	x			**Knowledge:** 1. Yes 2. No **Η γνώση:** 1. Ναι 2. Όχι 1Poznam 2ne poznam **Truth & competence:**
2. Environmental organisations such as Irish Environmental Network 2. Περιβαλλοντικές οργανώσεις όπως η Greenpeace?….. 2. Ministrstvo za zdravje				
3. Greek Atomic Energy Commission				

3. Η Ελληνική Επιτροπή Ατομικής Ενέργειας 3. Uprava RS za varstvo pred sevanji				1. Strongly disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly agree 9. I don't know/NA **Αλήθεια και ικανότητα:** 1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ 1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
4. Medical doctors (family doctor, general practitioners …) 4. Ιατροί (οικογενειακοί ιατροί, γενικοί ιατροί…) 4. Zdravniki (družinski zdravniki, splošni zdravniki)	x			
5 Podjetja, ki izvajajo meritve radona				
6 ZVD Zavod za varstvo pri delu doo				
7 Izvajalci sanacij (npr gradbeniki)				
8 Znanstveniki in raziskovalci				
9 Institut Jožef Stefan				
10 Radonova Laboratories AB				
12. Companies measuring radioactivity 12. Εταιρείες μέτρησης ραδιενέργειας Vprašanje v Sloveniji izključeno				
13. Technical chamber of Greece Vprašanje v Sloveniji izključeno				
14. Contractors for remediation 14.Εργολάβοι/μηχανικοί αποκατάστασης Vprašanje v Sloveniji izključeno				
15. Scientists of Demokritos research center 15. Επιστήμονες της ΕΕΑΕ				

Vprašanje v Sloveniji izključeno				
16. Owners/management of radon spa or caves 16 Ιδιοκτήτες/διαχείριση σπα ή σπηλαίων με ραδόνιο Vprašanje v Sloveniji izključeno				

INTRO:

You are now approximately halfway the questionnaire.

To what extent do you agree or disagree with the following statements?

ΕΙΣΑΓΩΓΗ: Σε ποιο βαθμό συμφωνείτε ή διαφωνείτε με τις ακόλουθες δηλώσεις;

V kolikšni meri se strinjate ali ne strinjate z naslednjimi trditvami? Prosimo, da vsako trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

Severity for self *(don't show this title to respondents)*		
RA12	Not acting when there is a high radon concentration in my house would be a severe threat to my health. Το να μην ενεργήσω όταν υπάρχει υψηλή συγκέντρωση ραδονίου στο σπίτι μου θα αποτελούσε σοβαρή απειλή για την υγεία μου. Neukrepanje v primeru visoke koncentracije radona v mojem domu bi resno ogrozilo moje zdravje.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
		1 . Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ
RA12.1	Not undertaking any action against high radon concentration in my house would be life-threatening. Η μη ανάληψη οποιασδήποτε δράσης για τη μείωση της υψηλής συγκέντρωση ραδονίου στο σπίτι μου θα ήταν απειλητική για τη ζωή μου. Neukrepanje v primeru visoke koncentracije radona v mojem domu bi ogrozilo moje življenje	1. sploh se ne strinjam 2. ne strinjam se
Severity for others *(don't show this title to respondents)*		

RA12.2	If my neighbours had high radon concentrations and don't remediate their health would be in severe danger. Εάν οι γείτονές μου έχουν υψηλές συγκεντρώσεις ραδονίου και δεν προβούν σε μέτρα αποκατάστασης, η υγεία τους θα κινδυνεύσει σοβαρά. Če bi imeli moji sosedje visoko koncentracijo radona in ne bi izvedli sanacije, bi bilo njihovo zdravje resno ogroženo.	3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
RA12.3	If people in my community address the radon risk then they can avoid serious health issues due to radon. Εάν οι άνθρωποι στην κοινότητά μου αντιμετωπίσουν τον κίνδυνο από τις υψηλές συγκεντρώσεις ραδονίου, τότε μπορούν να αποφύγουν σοβαρά προβλήματα υγείας λόγω του ραδονίου. Če ljudje v moji skupnosti ukrepajo v primeru radonskega tveganja, se lahko izognejo resnim zdravstvenim težavam zaradi radona.	

INTRO:

Now we would like to know your opinion about the health threat due to radon and how likely it is that radon causes health problems.

ΕΙΣΑΓΩΓΗ: Τώρα θα θέλαμε να μάθουμε τη γνώμη σας σχετικά με την απειλή για την υγεία λόγω του ραδονίου και πόσο πιθανό είναι το ραδόνιο να προκαλέσει προβλήματα υγείας.

Sedaj nas zanima vaše mnenje o nevarnosti radona za zdravje in o tem, kako verjetno je, da radon povzroča zdravstvene težave. Vsako od trditev ocenite na lestvici od 1 (zelo malo verjetno) do 5 (zelo verjetno)

Susceptibility for self *(don't show this title to respondents)*			
RA13	I believe that I can develop lung cancer due to radon if I don't tackle high concentration in my home.	1)	Very unlikely

	Πιστεύω ότι μπορεί να αναπτύξω καρκίνο του πνεύμονα λόγω του ραδονίου εάν δεν μειώσω τις υψηλές συγκεντρώσεις στο σπίτι μου. Menim, da lahko zaradi radona zbolim za pljučnim rakom, če ne bom ukrepal-a v primeru visoke koncentracije radona v svojem domu.	2) unlikely 3) somewhat likely 4) likely 5) very likely 9) I don't know/NA
		1 Zelo malo verjetno 2Malo verjetno 3 Nekoliko verjetno 4 Zelo verjetno 9 Ne vem/brez odgovora
RA14	How likely do you think it is that you will get sick if you don't remediate high radon concentrations? Πόσο πιθανό πιστεύετε ότι είναι να αρρωστήσετε εάν δεν μειώσετε τις υψηλές συγκεντρώσεις ραδονίου; Menim, da bom zbolel-a, če ne bom saniral-a visokih koncentracij radona v svojem domu.	
RA14.1	I will remain healthy although I don't remediate high radon concentrations in my home. Θα παραμείνω υγιής, ακόμα και αν δεν μειώσω τις υψηλές συγκεντρώσεις ραδονίου στο σπίτι μου. Ostal-a bom zdrav-a, čeprav ne bom saniral-a visokih koncentracij radona v svojem domu.	
Susceptibility for others *(don't show this title to respondents)*		
RA15	How likely do you think people in your neighbourhood will get sick if they don't remediate high radon concentrations? Πόσο πιθανό θεωρείτε ότι οι άνθρωποι στη γειτονιά σας θα νοσήσουν αν δεν μειώσουν τις υψηλές συγκεντρώσεις ραδονίου; Ljudje v moji soseski bodo zboleli, če ne bodo sanirali visokih koncentracij radona.	

INTRO:

To what extent do you agree or disagree with the following statements about remediation of the home due to radon?

ΕΙΣΑΓΩΓΗ: Σε ποιο βαθμό συμφωνείτε ή διαφωνείτε με τις ακόλουθες δηλώσεις σχετικά με την αποκατάσταση του σπιτιού λόγω ραδονίου;

V kolikšni meri se strinjate ali ne strinjate z naslednjimi trditvami o sanaciji doma zaradi radona? Vsako od trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

Response Efficacy Remediation *(don't show this title to respondents)*		
RA17	Home remediation, if needed, offers effective protection against radon hazards. Η αποκατάσταση του σπιτιού, εάν χρειάζεται, προσφέρει αποτελεσματική προστασία από τους κινδύνους ραδονίου. Sanacija doma, če je potrebna, zagotavlja učinkovito zaščito pred nevarnostjo radona.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
RA18.1	Home remediation, if needed, will fail to protect from high radon concentrations. Η αποκατάσταση του σπιτιού, εάν χρειαστεί, δε θα μπορέσει να προστατεύσει από τις υψηλές συγκεντρώσεις ραδονίου Sanacija doma, če je potrebna, me ne bo zaščitila pred visokimi koncentracijami radona.	1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ
RA19	A special installation would eliminate the radon hazard if needed. Μια ειδική εγκατάσταση θα εξαλείψει τον κίνδυνο ραδονίου εάν χρειαστεί. Po potrebi bi nevarnost radona odpravili z vgradnjo temu namenjenega sistema ali naprave.	
RA19.1	A special installation can NOT reduce radon to a safe level in homes that have a radon problem. Μια ειδική εγκατάσταση ΔΕΝ μπορεί να μειώσει το ραδόνιο σε ασφαλές επίπεδο σε σπίτια που έχουν πρόβλημα με το ραδόνιο. Vgradnja prilagojenega sistema ali naprave ne more zmanjšati radona na varno raven v domovih, ki imajo težave z radonom.	1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora

INTRO:

To what extent do you agree or disagree with the following statements?

ΕΙΣΑΓΩΓΗ: Σε ποιο βαθμό συμφωνείτε ή διαφωνείτε με τις ακόλουθες δηλώσεις;

V kolikšni meri se strinjate ali ne strinjate z naslednjimi trditvami? Vsako od trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

Response Efficacy Testing *(don't show this title to respondents)*		
RA21	I am confident that I would be able to test the indoor radon concentrations in my home if I wanted to. Είμαι βέβαιος ότι θα μπορούσα να μετρήσω τη συγκέντρωση ραδονίου στο σπίτι μου, αν το ήθελα. Prepričan-a sem, da bi lahko izmeril-a koncentracijo radona v svojem domu, če bi želel-a.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ 1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
Self Efficacy Remediation *(don't show this title to respondents)*		
RA21.b	I am NOT confident that I will be able to effectively remediate my home if I wanted to. ΔΕΝ είμαι σίγουρος ότι θα μπορέσω να αποκαταστήσω αποτελεσματικά το σπίτι μου αν το ήθελα. Nisem prepričan-a, da bi lahko učinkovito saniral-a svoj dom, če bi želel-a.	
RA22	I am confident I would be able to hire a contractor to decrease the indoor radon concentration if I wanted to. Είμαι βέβαιος ότι θα μπορούσα να προσλάβω έναν εργολάβο για να μειώσει τη συγκέντρωση ραδονίου στους εσωτερικούς χώρους, αν το ήθελα. Prepričan-a sem, da bi lahko najel-a izvajalca sanacij za zmanjšanje koncentracije radona v prostoru, če bi želel-a.	
Self Efficacy Obtaining Information *(don't show this title to respondents)*		
RA33	I am confident that in the case of high levels of radon in my home, I will find the information needed to protect myself. Είμαι βέβαιος ότι σε περίπτωση υψηλών επιπέδων ραδονίου στο σπίτι μου, θα βρω τις απαραίτητες πληροφορίες για να προστατευτώ. Prepričan-a sem, da bom v primeru visokih koncentracij radona v svojem domu, našel-a potrebne informacije za zaščito.	

INTRO:

To what extent do you agree or disagree with the following statements?

ΕΙΣΑΓΩΓΗ: Σε ποιο βαθμό συμφωνείτε ή διαφωνείτε με τις ακόλουθες δηλώσεις;

V kolikšni meri se strinjate ali ne strinjate s sledečima trditvama? Vsako od trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

General Self-Efficacy *(don't show this title to respondents)*		
RA22.a	Prepričan-a sem, da bi lahko odštel-a 50 evrov za meritve radona, če bi bilo to potrebno.	1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
RA22.b	Prepričan-a sem, da bi po potrebi lahko odštel-a 1000 evrov za sanacijo zaradi radona.	
RA22.c	I can always manage to solve difficult problems if I try hard enough. Μπορώ πάντα να καταφέρνω να λύσω δύσκολα προβλήματα αν προσπαθώ αρκετά. Vprašanje je bilo v Sloveniji izključeno.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
RA22.d	I can solve most problems if I invest the necessary effort. Μπορώ να λύσω τα περισσότερα προβλήματα εάν καταβάλω την απαραίτητη προσπάθεια. Vprašanje je bilo v Sloveniji izključeno.	
RA22.e	When I am confronted with a problem, I can usually find solutions. Όταν αντιμετωπίζω ένα πρόβλημα, συνήθως μπορώ να βρω λύσεις Vprašanje je bilo v Sloveniji izključeno.	1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ

Perceived Burden *(don't show this title to respondents)*

RA23.1	I believe reducing radon in my home would require more resources than I have. Πιστεύω ότι η μείωση του ραδονίου στο σπίτι μου θα απαιτούσε περισσότερους πόρους από αυτούς που διαθέτω. Menim, da bi ukrepi za zmanjšanje radona v mojem domu zahtevali več sredstev, kot jih imam.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. Don't know / no answer 1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ 1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
RA23.2	I believe reducing radon would be burdensome for me. Πιστεύω ότι η μείωση του ραδονίου θα ήταν επαχθής για μένα. Menim, da bi bili ukrepi za zmanjšanje radona zame obremenjujoči.	
Perceived Cost *(don't show this title to respondents)*		
RA23	I believe that the cost for remediation of my home to reduce the indoor radon concentration is low. Πιστεύω ότι το κόστος για την αποκατάσταση του σπιτιού μου για τη μείωση της συγκέντρωσης ραδονίου σε εσωτερικούς χώρους είναι χαμηλό. Menim, da so stroški sanacije mojega doma za zmanjšanje koncentracije radona nizki.	
RA26	I guess I could easily obtain personal advice from a local expert on how to control the radon concentration in my home. Υποθέτω ότι θα μπορούσα εύκολα να λάβω προσωπικές συμβουλές από έναν τοπικό ειδικό για το πώς να ελέγξω τη συγκέντρωση ραδονίου στο σπίτι μου. Mislim, da bi lahko zlahka dobil-a osebni nasvet lokalnega strokovnjaka o tem, kako nadzorovati koncentracijo radona v mojem domu.	
Perceived Ease *(don't show this title to respondents)*		
RA24	I believe the procedure for radon **testing** my home is easy. Πιστεύω ότι η διαδικασία για τη **μέτρηση του ραδονίου** στο σπίτι μου είναι εύκολη. Menim, da je postopek merjenja radona v mojem domu enostaven.	

RA25	I believe the procedure for **remediating** my home due to radon is difficult. Πιστεύω ότι η διαδικασία για την **αποκατάσταση του** σπιτιού μου λόγω ραδονίου είναι δύσκολη. Menim, da je postopek za sanacijo mojega doma zaradi radona zahteven.	

Esthetic Impact *(don't show this title to respondents)*		
RA51	Remediation due to exceeded levels of radon would visually destroy my home. Η αποκατάσταση εξαιτίας των υπερβαίνοντων (υψηλών?) επιπέδων ραδονίου θα επηρέαζε αρνητικά την εμφάνιση του σπιτιού μου. Sanacija zaradi presežene ravni radona bi vizualno uničila moj dom.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
Economic Impact *(don't show this title to respondents)*		
RA51.b	A radon problem can influence the value of property. Ένα πρόβλημα ραδονίου μπορεί να επηρεάσει την εμπορική αξία του ακινήτου. Problem z radonom lahko vpliva na vrednost nepremičnine.	1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ 1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora

INTRO:

To what extent do you agree or disagree with the following statements?

V kolikšni meri se strinjate ali ne strinjate z naslednjimi trditvami? Vsako od trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

Subjective Norm *(don't show this title to respondents)*		1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
RA34	Most people who are important to me are NOT in favour of me testing for indoor radon. Οι περισσότεροι άνθρωποι που είναι σημαντικοί για μένα ΔΕΝ είναι υπέρ του να κάνω μετρήσεις για ραδόνιο σε εσωτερικούς χώρους του σπιτιού μου(?). Večina ljudi, ki so mi pomembni, NE podpira da bi izmeril radon v domu.	
RA34b	Most people who are important to me are in favour of me remediating my home for radon if needed. Οι περισσότεροι άνθρωποι που είναι σημαντικοί για μένα είναι υπέρ του να αποκαταστήσω το σπίτι μου για ραδόνιο εάν χρειαστεί. Večina ljudi, ki so mi pomembni, je za to, da po potrebi saniram svoj dom zaradi radona.	
RA34.1	In general, people who are important to me would like me to be informed about radon.	

	Γενικά, τα άτομα που είναι σημαντικά για μένα θα ήθελαν να ενημερωθώ για το ραδόνιο. Na splošno ljudje, ki so mi pomembni, želijo, da sem obveščen-a o radonu.
RA34.2	People who are significant in my life don't care about my actions related to radon in my home. Οι άνθρωποι που είναι σημαντικοί στη ζωή μου δεν ενδιαφέρονται για τις ενέργειές μου σχετικά με το ραδόνιο στο σπίτι μου. Ljudem, ki so pomembni v mojem življenju, ni mar za moja dejanja, povezana z radonom v mojem domu.

Anticipated Emotion *(don't show this title to respondents)*		
RA28	FILTER: IF RA22.b = 3, 4, 5 I would feel regret if I had not remediated my home against radon and ended up getting lung cancer. ΦΙΛΤΡΟ: ΑΝ RA22.b = 3, 4, 5 Θα λυπόμουν αν δεν είχα αποκαταστήσει το σπίτι μου από το ραδόνιο και κατέληγα να πάθω καρκίνο του πνεύμονα. Vprašanje je bilo v Sloveniji izključeno.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
RA29	FILTER: RA22.b = 3, 4, 5 I would be ashamed not to remediate my home if indoor radon levels exceeded the limits. ΦΙΛΤΡΟ: RA22.b = 3, 4, 5 Θα ντρεπόμουν να μην αποκαταστήσω το σπίτι μου εάν τα επίπεδα ραδονίου σε εσωτερικούς χώρους ξεπερνούσαν τα όρια. Vprašanje je bilo v Sloveniji izključeno.	1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 9. ΔΞ/ΔΑ
RA29.a	FILTER: IF RA22.b = 3, 4, 5 I would feel guilty about living in a home with high radon concentrations because I did not remediate it. ΦΙΛΤΡΟ: ΑΝ RA22.b = 3, 4, 5 Θα αισθανόμουν ένοχος που ζούσα σε ένα σπίτι με υψηλές συγκεντρώσεις ραδονίου επειδή δεν το αποκατέστησα. Vprašanje je bilo v Sloveniji izključeno.	

INTRO:

To what extent do you agree or disagree with the following statements?

ΕΙΣΑΓΩΓΗ: Σε ποιο βαθμό συμφωνείτε ή διαφωνείτε με τις ακόλουθες δηλώσεις;

V kolikšni meri se strinjate ali ne strinjate z naslednjimi trditvami? Vsako od trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

Descriptive Norm RANDOMISE *(don't show this title to respondents)*		1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
RA35	I believe most people in my neighbourhood **tested** their houses for indoor radon. Πιστεύω ότι οι περισσότεροι άνθρωποι στη γειτονιά μου έχουν **μετρήσει** τα σπίτια τους για ραδόνιο σε εσωτερικούς χώρους. Mislim, da je večina ljudi v moji soseski izmerila koncentracijo radona v svojem domu.	
RA35a	I believe most people that I know do something related to indoor radon. Πιστεύω ότι οι περισσότεροι άνθρωποι που γνωρίζω έχουν κάνει/κάνουν κάτι σχετικό με το ραδόνιο σε εσωτερικούς χώρους. Verjamem, da večina ljudi, ki jih poznam, počne nekaj, kar je povezano z radonom v zaprtih prostorih.	1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 6. ΔΞ/ΔΑ
RA36	I believe most people in my neighborhood **remediated** their houses when indoor radon levels exceeded the limits. Πιστεύω ότι οι περισσότεροι άνθρωποι στη γειτονιά μου **επισκεύασαν** τα σπίτια τους όταν τα επίπεδα ραδονίου σε εσωτερικούς χώρους ξεπέρασαν τα όρια. Menim, da je večina ljudi v moji soseski sanirala svoje domove, ko je koncentracija radona v prostoru presegla mejne vrednosti.	1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
RA37	As far as I know, most of my friends living in the same neighbourhood did NOT test their houses. Από όσο ξέρω, οι περισσότεροι φίλοι μου που μένουν στην ίδια γειτονιά ΔΕΝ μέτρησαν τα σπίτια τους. Kolikor vem, večina mojih prijateljev, ki živijo v isti soseski, v svojih domovih ni merila koncentracij radona.	

Health Effect Perception *(don't show this title to respondents)*		1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 9. ΔΞ/ΔΑ 1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
RA37.1	I personally know people that may have health problems due to radon. Osebno poznam ljudi, ki imajo morda zdravstvene težave zaradi radona.	

Stigma *(don't show this title to respondents)*		1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. Διαφωνώ κάθετα
ST1	I would feel embarrassed to have radon in my home. Θα *αισθανόμουν* αμήχανα επειδή έχω ραδόνιο στο σπίτι μου. Vprašanje je bilo v Sloveniji izključeno.	
ST2	I would work hard to keep a radon problem a secret. Αν το σπίτι μου είχε υψηλή συγκέντρωση ραδονίου, θα το κρατούσα μυστικό για να μην το μάθουν οι άλλοι. Trudil bi se, da bi težave z radonom ostale skrivnost.	

ST3	Having radon in house would make me feel like I'm a bad person. Το ραδόνιο στο σπίτι μου θα με έκανε να νιώθω ότι είμαι κακός άνθρωπος. Vprašanje je bilo v Sloveniji izključeno.	2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 9. ΔΞ/ΔΑ
ST4	I would be very careful whom I would tell if I had a radon problem in my home. Θα *ήμουν* πολύ προσεκτικός σε ποιον λέω ότι έχω ραδόνιο στο σπίτι μου. Zelo bi bil previden, komu povem, da imam težave z radonom v svojem domu.	1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora

Social Influence RANDOMISE *(don't show this title to respondents)*		1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
SIS1	I don't watch others to learn new things Δεν παρακολουθώ άλλους για να μάθω νέα πράγματα Vprašanje je bilo v Sloveniji izključeno.	
SIS2	I don't compare myself to other people Δεν συγκρίνω τον εαυτό μου με άλλους ανθρώπους Vprašanje je bilo v Sloveniji izključeno.	
SIS3	I prefer to act the way everyone else is acting Προτιμώ να συμπεριφέρομαι όπως όλοι οι άλλοι Vprašanje je bilo v Sloveniji izključeno.	1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 9. ΔΞ/ΔΑ
SIS4	When I realize people are working on something important to me, I also want to start doing it. Όταν συνειδητοποιώ ότι οι άνθρωποι εργάζονται σε κάτι σημαντικό για μένα, θέλω κι εγώ να ξεκινήσω να το κάνω Vprašanje je bilo v Sloveniji izključeno.	
SIS5	I don't like to collaborate with people Δεν μου αρέσει να συνεργάζομαι με ανθρώπους Vprašanje je bilo v Sloveniji izključeno.	

SIS6	I don't like to compete with people Δεν μου αρέσει να ανταγωνίζομαι τους ανθρώπους Vprašanje je bilo v Sloveniji izključeno.	
SIS7	I enjoy when my achievements are acknowledged in public Μου αρέσει όταν τα επιτεύγματά μου αναγνωρίζονται δημόσια Vprašanje je bilo v Sloveniji izključeno.	

INTRO:

We are in the final part of the questionnaire. To what extent do you agree or disagree with the following statements related to information about radon?

ΕΙΣΑΓΩΓΗ: Είμαστε στο τελευταίο μέρος του ερωτηματολογίου. Σε ποιο βαθμό συμφωνείτε ή διαφωνείτε με τις ακόλουθες δηλώσεις που σχετίζονται με πληροφορίες σχετικά με το ραδόνιο;

V zadnjem delu vprašalnika nas zanima v kolikšni meri se strinjate ali ne strinjate z naslednjimi trditvami, povezanimi z informacijami o radonu? Vsako od trditev ocenite na lestvici od 1 (sploh se ne strinjam) do 5 (popolnoma se strinjam).

Systematic Processing RANDOMISE *(don't show this title to respondents)*		
INPR1	In order to be completely informed about home remediation, I think that the more viewpoints I get, the better off I will be. Για να είμαι πλήρως ενημερωμένος για την αποκατάσταση κατοικιών, πιστεύω ότι όσο περισσότερες απόψεις έχω, τόσο καλύτερα θα είμαι. Več različnih stališč, kot poznam, bolje bom seznanjen –a glede sanacije svojega doma.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 9. ΔΞ/ΔΑ
INPR2	I have been very attentive to the information related to radon remediation. Έχω παρακολουθήσει πολύ προσεκτικά τις πληροφορίες σχετικά με την αποκατάσταση του ραδονίου. Zelo sem pozoren-na na informacije, povezane s sanacijo radona.	
INPR3	When the topic of radon remediation came up, I tried to learn more about it. Όταν τέθηκε το θέμα της αποκατάστασης του ραδονίου, προσπάθησα να μάθω περισσότερα για αυτό. Ko se je pojavi tema o sanaciji radona, sem skušal-a o njej izvedeti čim več.	
INPR4	It was important for me to clarify how I should remediate my home. Ήταν σημαντικό για μένα να ξεκαθαρίσω πώς έπρεπε να αποκαταστήσω το σπίτι μου.	

	Pomembno mi je bilo razumeti, kako naj saniram svoj dom.	1. sploh se ne strinjam 2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
INPR5	When I encountered information about radon remediation of homes, I carefully considered it. Όταν συνάντησα πληροφορίες σχετικά με την αποκατάσταση σπιτιών με ραδόνιο, τις εξέτασα προσεκτικά. Ko naletim na informacije o sanaciji domov z radonom, jih skrbno preučim.	

Heuristic Processing RANDOMISE *(don't show this title to respondents)*		1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA 1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 9. ΔΞ/ΔΑ 1. sploh se ne strinjam 2. ne strinjam se
INPR6	On issues like radon home remediation I just go with my gut feeling. Σε θέματα όπως η αποκατάσταση του ραδονίου, απλώς ακολουθώ το ένστικτό μου. Pri vprašanjih, kot je sanacija domov z radonom, se ravnam po svojem občutku.	
INPR7	Past experiences with health related issues have made it easier for me to form an opinion about the need to remediate my home. Οι προηγούμενες εμπειρίες μου με θέματα που σχετίζονται με την υγεία με διευκόλυναν να σχηματίσω γνώμη σχετικά με την ανάγκη αποκατάστασης του σπιτιού μου. Zaradi preteklih izkušenj z zdravstvenimi težavami lažje oblikujem mnenje o potrebi po sanaciji svojega doma.	
INPR8	On the matter of remediation I shall simply place my trust in the experts and respect their recommendations. Όσον αφορά το θέμα της αποκατάστασης, θα εμπιστευτώ απλώς τους ειδικούς και θα σεβαστώ τις συστάσεις τους. Glede sanacije bom preprosto zaupal-a strokovnjakom in upošteval-a njihova priporočila	
INPR9	Related to decisions concerning radon remediation, I follow the people from my environment, e.g. family, neighbours.	

	Σχετικά με αποφάσεις που αφορούν την αποκατάσταση του ραδονίου, ακολουθώ τους ανθρώπους από το περιβάλλον μου, π.χ. οικογένεια, γείτονες. Pri odločitvah v zvezi s sanacijo radona upoštevam ljudi iz svojega okolja, npr. družino, sosede.	3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
INPR10	I could easily form an opinion about the need to remediate my home without seeking additional information, based on my existing knowledge. Θα μπορούσα εύκολα να σχηματίσω γνώμη για την ανάγκη αποκατάστασης του σπιτιού μου χωρίς να αναζητήσω επιπλέον πληροφορίες, με βάση τις υπάρχουσες γνώσεις μου. Na podlagi obstoječega znanja lahko brez težav oblikujem mnenje o potrebi po sanaciji svojega doma, ne da bi poiskal-a dodatne informacije.	

Information comprehensiveness *(don't show this title to respondents)*		
RA30	I don't feel well informed about which actions are needed related to indoor radon levels. Δεν αισθάνομαι καλά ενημερωμένος σχετικά με τις δράσεις που απαιτούνται για τα επίπεδα ραδονίου εσωτερικού χώρου Nimam občutka, da bi bil—a dobro obveščen-na o potrebnih ukrepih v zvezi z ravnjo radona v zaprtih prostorih.	1. Strongly Disagree 2. Disagree 3. Neither agree, nor disagree 4. Agree 5. Strongly Agree 9. I don't know/NA
RA31	There is enough information for me to decide whether I should perform a radon test at home. Υπάρχουν αρκετές πληροφορίες για να αποφασίσω αν θα πρέπει να κάνω μέτρηση ραδονίου στο σπίτι. Na voljo je dovolj informacij, da se lahko odločim, ali naj doma opravim meritev radona.	1. Διαφωνώ κάθετα 2. Διαφωνώ 3. Ούτε συμφωνώ, ούτε διαφωνώ 4. Συμφωνώ 5. Συμφωνώ απόλυτα 9. ΔΞ/ΔΑ
Information uncertainty *(don't show this title to respondents)*		
RA50	Information about the health effect of radon is still too uncertain to take actions based on it. Οι πληροφορίες σχετικά με τις επιπτώσεις του ραδονίου στην υγεία είναι ακόμη πολύ αβέβαιες για να ληφθούν μέτρα με βάση αυτές.	1. sploh se ne strinjam

	Informacije o vplivu radona na zdravje so še vedno preveč negotove, da bi lahko na njihovi podlagi sprejemali ukrepe.	2. ne strinjam se 3. niti se ne strinjam, niti se strinjam 4. strinjam se 5. popolnoma se strinjam 9. ne vem/brez odgovora
Affective Response to information *(don't show this title to respondents)*		
RA10	Information about radon makes me worry. Οι πληροφορίες για το ραδόνιο με κάνουν να ανησυχώ. Zaradi informacij o radonu sem zaskrbljen-a.	
RA11	Information about radon makes me nervous. Οι πληροφορίες για το ραδόνιο με αγχώνουν. Informacije o radonu me delajo nervoznega-o.	
Preference for Post-Survey Radon Information *(don't show this title to respondents)*		
MINF1	Which information channels would be the most appropriate for you, to receive more information about radon? (multiple answers possible) Ποιο κανάλι πληροφορησης θα ήταν το καταλληλότερο για εσάς, για να λάβετε περισσότερες πληροφορίες σχετικά με το ραδόνιο; Kateri informacijski kanali bi bili za vas najprimernejši, da bi dobili več informacij o radonu? Izberete lahko več odgovorov.	**! (multiple options)** **RANDOMISE 2-11** 1. I am not interested in more information about radon 2. Television 3. Radio 4. Newspaper 5. Leaflet 6. Personalized information letter 7. Information from the school 8. Social Media 9. Meeting with the local community 10. Telephone 11. Email 12. Other 99. I don't know/NA 1. Δεν με ενδιαφέρουν περισσότερες πληροφορίες για το ραδόνιο 2. Τηλεόραση 3. Ραδιόφωνο 4. Εφημερίδα

		5. Φυλλάδιο 6. Εξατομικευμένη πληροφοριακή επιστολή 7. Πληροφορίες από το σχολείο 8. Social Media 9. Συνάντηση με την τοπική κοινωνία 10. Τηλέφωνο 11. Email 12. Άλλο 9. ΔΞ/ΔΑ 1 Več informacij o radonu me ne zanima 2 Televizija 3 Radio 4 Časopisi 5 Letak 6 Osebno informativno pismo 7 Informacije iz šole 8 Družabni mediji 9 Srečanje z lokalno skupnostjo 10 Telefon 11 Elektronska pošta 12 Drugo (prosimo, vpišite): * 99 *Ne vem / brez odgovora*

DEBRIEF:

Thank you for participating in this survey. This research was carried out in the context of the European research project RadoNorm, see https://www.radonorm.eu. If you have any questions or concerns about this study and the research procedures used, you may contact …. (name). For more information about radon, measurements and remediation, consult the website www.eeae.gr.

ΣΤΟΙΧΕΙΑ:

Σας ευχαριστούμε για τη συμμετοχή σας σε αυτή την έρευνα. Η έρευνα αυτή διεξήχθη στο πλαίσιο του ευρωπαϊκού ερευνητικού έργου RadoNorm, βλ . https://www.radonorm.eu . Εάν έχετε οποιεσδήποτε ερωτήσεις ή απορίες σχετικά με αυτήν τη μελέτη και τις ερευνητικές

διαδικασίες που χρησιμοποιήθηκαν, μπορείτε να επικοινωνήσετε με .... (*όνομα*). Για περισσότερες πληροφορίες σχετικά με το ραδόνιο, τις μετρήσεις και την αποκατάσταση, συμβουλευτείτε την ιστοσελίδα www.eeae.gr.

Odgovorili ste na vsa vprašanja.

Hvala, ker ste sodelovali v tej raziskavi Uprave za varstvo pred sevanji v sodelovanju z evropskim raziskovalnim projektom RadoNorm, (https://www.radonorm.eu).

Če imate kakršnakoli vprašanja ali pomisleke v zvezi s to raziskavo in uporabljenimi raziskovalnimi postopki, se lahko obrnete na Upravo za varstvo pred sevanji. Za več informacij o radonu, meritvah in zmanjševanju radona obiščite:

https://www.gov.si/teme/zmanjsevanje-izpostavljenosti-radonu

5. Apendix B: Embaded video (EN-SI)

(Source of the video: Winsconsin department of health services, LowRadon.org and adopted to the national context – language and additional information; https://www.youtube.com/watch?v=50fX56kZiww&feature=youtu.be; accessed in 2020)

:00 Hi, and welcome to Radon 101. First, it's
0:04 important to know that radon is a gas,
0:06 invisible and odorless. Radon is
0:09 naturally occurring. It's a radioactive
0:11 gas that comes off rocks deep in the
0:12 soil. See, houses are like humans; they
0:15 breathe in and out. If your house is
0:20 built on, or even near, an area with radon,
0:23 this gas can move through the ground and
0:25 seep in through tiny cracks in your
0:26 basement floor. And over time, this
0:29 invisible, odorless gas can cause deadly
0:31 lung cancer. And while most people don't
0:34 have high radon levels in their home,
0:35 some do. But don't panic.
0:38 You can have your house tested and find
0:40 out if you have a radon problem. If you
0:42 have a radon problem, an expert can help
0:45 you fix it simply and easily. It's a
0:47 method called sub-slab depressurization.
0:48 Sounds fancy, but it's really very simple.
0:51 If you have radon gas creeping through
0:53 cracks in your house, experts can help by
0:56 sealing up any cracks in your basement
0:58 floor or sub-area, installing a pipe with a
1:00 fan in your basement floor and routing
1:02 it outside, and up, up, up above your
1:05 roofline into the outdoor air and away
1:07 from your home. Once it's in place, the
1:10 radon expert will test to make sure it's
1:11 working and show you how to check it too.
1:13 But the first step is the most important;
1:16 get your home tested.
1:18 You'll breathe easier and your house will
1:20 too. Just visit LowRadon.org to
1:25 find out more.

0:00 Pozdravljeni in dobrodošli na minuti o radonu.
0:04 Za začetek povejmo, da je radon naraven plin,
0:06 neviden ter brez vonja.
0:08 Je radioaktiven plin, ki nastane
0:10 z globoko v zemeljski skorji.
0:12 Poglejte, domovi so kot ljudje; vdihujejo in izdihujejo.
0:15 Če je vaš dom zgrajen
0:20 na območju z radonom ali v njegovi bližini,
0:23 lahko ta plin skozi drobne razpoke v tleh
0:26 prodre v vaš dom. Sčasoma lahko ta
0:29 nevidni plin brez vonja povzroči smrtonosnega raka na pljučih.
0:31 In čeprav v večini domov
0:34 koncentracija radona ni visoka,
0:35 ga je v nekaterih domovih veliko.
0:36 Toda brez panike.
0:38 Koncentracijo radona v vašem domu lahko izmerite.
0:40 Če ugotovite, da je v vašem domu
0:42 veliko radona, vam ga lahko strokovnjaki
0:45 pomagajo odstraniti.
0:47 Uporablja se metoda odvajanja radona,
0:48 ki je preprosta.
0:51 Če se radon prikrade skozi špranje v vašem domu,
0:53 lahko strokovnjaki
0:56 zatesnijo špranje v tleh vaše kleti
0:58 ali pritličja in namestijo cev z
1:00 ventilatorjem ter radon odvedejo
1:02 stran, stran od vašega doma.
1:05
1:07 Ko je sistem nameščen,
1:10 bo strokovnjak za radon preveril ali je učinkovit
1:11 in vam pokazal, kako to preverite tudi sami.
1:13 A najpomembnejši je prvi korak:
1:16 izmerite koncentracijo radona v vašem domu.
1:18 Vi si boste oddahnili in vaš dom bo lažje dihal.
1:20 Za več informacij obiščite spletno stran Uprave RS za varstvo pred sevanji.
1:25.