Exploring the social perception of radon in Germany

Christiane Pölzl-Viol

NORM X 2022 / RICOMET 2022

Tuesday May 10th 2022, Utrecht
Outline

1. Results of the project “Impact of governmental support measures on implementing radon remediation measures in the housing sector – an assessment of potential”

2. Results of the project “Survey of the German population’s dealing with radon as a basis for risk communication and strengthening of protective behavior”

3. Overarching conclusions and way forward
Project state subsidies: aim and methodology

Research question:

To what extent would a governmental subsidy programme for radon remediation in residential buildings lead to additional radon remediation activities?

Methodology

• Literature analysis and expert interviews
• Qualitative interviews with home owners
• Potential assessment
Project state subsidies: results (1)

Starting points to motivate people to radon remediation:

• Health aspect, risk perception
• Willingness to renovate
• Cost-benefit trade-offs: a typical, but not the sole approach to radon testing and remediation decisions.
• Building renovation typically takes place for a number of reasons. This must be taken into account in the information work.

• Promotional conditions:
  • include statement on radon concentration in rental contracts.
  • With regard to real estate purchases, purchase contract templates could take into account the issue of radon.

• Effects are assumed for a funding rate range between 20% and 50%
• An "optimal" funding rate is not a sufficient condition for extensive take-up and high effectiveness of the funding programme.
Project state subsidies: results (2)

- Lack of awareness of radon as a health risks would be main barrier to make use a funding programme
- Easy access and unbureaucratic application of funding is essential (application, proof of costs, proof of effects)
- Signalling effect: Effect of a funding programme would not only be the financial relief but also showing that radon is a risk that is taken seriously by the state
- A funding programme would require **continuous, active providing of information** on the topic of radon in living space.
Project state subsidies: baseline scenario for quantitative assessment

Assumption: 370,000 buildings in Germany with radon levels above 300 Bq/m³

Baseline scenario, without an information campaign and without a funding programme:

- 1% of the buildings are detected with a radon concentration above 300 Bq/m³ (about 3,700 residential buildings per year)
- 3% remediate (approx. 110 radon remediations per year).

- It is estimated that a subsidy programme can lead to 2,000 to 22,000 additional radon remediations yearly in Germany.
Project state subsidies: quantitative assessment

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Number of additional radon levels detected above 300 Bq/m³</th>
<th>Number of additional radon levels detected above 300 Bq/m³</th>
<th>Number of additional yearly radon remediation</th>
<th>Number of additional yearly radon remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pessimistic</td>
<td>7.400</td>
<td>14.800</td>
<td>400</td>
<td>1.200</td>
</tr>
<tr>
<td>Optimistic</td>
<td>14.800</td>
<td>33.300</td>
<td>1.700</td>
<td>5.100</td>
</tr>
<tr>
<td>Scenario 2:</td>
<td>33.300</td>
<td>70.300</td>
<td>1.700</td>
<td>5.100</td>
</tr>
<tr>
<td>Scenario 3:</td>
<td>14.800</td>
<td>33.300</td>
<td>1.700</td>
<td>5.400</td>
</tr>
<tr>
<td>Scenario 4:</td>
<td>14.800</td>
<td>33.300</td>
<td>1.700</td>
<td>5.400</td>
</tr>
<tr>
<td>Scenario 5:</td>
<td>33.300</td>
<td>70.300</td>
<td>3.600</td>
<td>11.000</td>
</tr>
<tr>
<td>Scenario 6:</td>
<td>14.800</td>
<td>33.300</td>
<td>3.600</td>
<td>11.000</td>
</tr>
<tr>
<td>Scenario 7:</td>
<td>33.300</td>
<td>70.300</td>
<td>7.300</td>
<td>22.100</td>
</tr>
</tbody>
</table>
Project state subsidies: Conclusion

- A subsidy programme for radon remediation can trigger a significant "push" among residential building owners
  - who already have a certain openness towards radon measurement or radon remediation
  - or who are not sure about radon remediation.
- A support programme rarely seems to cause a change of opinion or intention to act among people who do not consider radon measurement
- **Whether** the subsidy programme would be effective, depends on
  - supporting radon measurements in large numbers
  - offering independent, competent consultation services to home owners.
- **Challenges:**
  - very high number of radon measurements would be required;
  - need for training of radon experts and remediation companies
Project social dealing with radon: research question and methodology

**Research question**

- What is the knowledge on radon and possible protective measures in Germany’s general public?
- How is the risk perception and information behaviour focused on radon?

**Methodology:**

- Qualitative Study: 30 individual interviews, 2 Focus groups
- Quantitative study: online survey, n=3000, 20 min
Project social dealing with radon: results of the qualitative study

Radon

Vague assumptions

Correct Knowledge

False Knowledge
Project social dealing with radon: results of the qualitative study

- In the qualitative study: Knowledge about radon and its health risks is very low across all respondents
- Only little false knowledge
- The majority shows itself to be in principle very amenable to the topic.
- However, the majority of respondents express surprise that they have not heard of such a relevant health risk before.
- Perception “if radon would be dangerous we would have heard about it”
- After dealing with information on radon risks and possible protective measures, the willingness to act depends above all on the assessment of personal concern.
- Here, different communication materials shown in the interviews have very different effects
Project social dealing with radon: results of the quantitative study
(not yet published)
Without explanation 58% of the respondents know radon, with explanation about 65% of the respondents say they know radon.

Q1: Have you ever heard or read about radon? Would you say...
Q8: Radon is a natural gas that occurs in rocks and soil in varying concentrations, even in Germany. Radon can accumulate in houses, especially in the basement and the lower floors, and can cause lung cancer if the concentration is high enough over a long period of time. Have you ever heard or read about the noble gas radon?
77% of respondents who know about radon do not know if they live in an area with elevated radon concentration.

Knowledge Area
Radon concentration

Yes, I live in an area with elevated radon concentration
No, I do not live in an area with elevated radon concentration
I don’t know

Q18: Do you know if you live in an area with increased radon concentration?

Base: Total, n=1.929/130/331/299/337/338/452, in %
Only very few of the respondents (about 10%) who know radon in a aided way consider their knowledge to be (very) great.

Perceived informedness

Q8: Have you ever heard or read about the noble gas radon?
Q9: How much do you know about radon and its effects? Please answer on a scale of 1 to 5, where 1 means "very little" and 5 means "very much".

Base: n=1,929/ %
77% of respondents are familiar with the BfS, but only about 5% of them have ever visited the BfS website.

Q10: Do you know the Federal Office for Radiation Protection, even if only by name?
Q11: What exactly do you think the Federal Office for Radiation Protection does?
Q12: Have you ever visited the website of the Federal Office for Radiation Protection?
More than half of the respondents who know radon (aided) have not yet informed themselves about the topic of radon. The most common source of information is the internet.

**Information behaviour**

<table>
<thead>
<tr>
<th>Source of Information</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, already informed about the topic</td>
<td>40</td>
</tr>
<tr>
<td>Internet in general</td>
<td>21</td>
</tr>
<tr>
<td>Television / media libraries</td>
<td>11</td>
</tr>
<tr>
<td>Daily or weekly newspapers</td>
<td>9</td>
</tr>
<tr>
<td>Friends, family, colleagues</td>
<td>5</td>
</tr>
<tr>
<td>Federal office for Radiation Protection</td>
<td>4</td>
</tr>
<tr>
<td>Social Media</td>
<td>3</td>
</tr>
<tr>
<td>Radio / Radio web services</td>
<td>3</td>
</tr>
<tr>
<td>Family doctor/doctor</td>
<td>3</td>
</tr>
<tr>
<td>Federal Environmental Agency</td>
<td>3</td>
</tr>
<tr>
<td>Authorities in general</td>
<td>2</td>
</tr>
<tr>
<td>Federal Ministry of Health</td>
<td>2</td>
</tr>
<tr>
<td>Community/communal/rural author</td>
<td>2</td>
</tr>
<tr>
<td>Blogs / forums on the Internet, podcasts</td>
<td>1</td>
</tr>
<tr>
<td>Consumer protection centre</td>
<td>1</td>
</tr>
<tr>
<td>Architects / building contractors</td>
<td>1</td>
</tr>
<tr>
<td>Landlord / seller of the property</td>
<td>1</td>
</tr>
<tr>
<td>Informed elsewhere</td>
<td>6</td>
</tr>
<tr>
<td>No, never informed</td>
<td>58</td>
</tr>
<tr>
<td>Don’t know</td>
<td>2</td>
</tr>
</tbody>
</table>

Q13: Have you ever read up on the subject of radon?

Base: n=1.929 in %
The vast majority of respondents see hardly any risk for themselves personally from radon / consider an increased radon concentration in the living space unlikely.

### Perceived Risk

**Q14**: How high do you estimate the health risk to you personally from radon?

1. very low
2. not at all
3. not much
4. average
5. very high

**Q15**: How likely do you think it is that your living space has elevated radon levels?

1. very unlikely
2. unlikely
3. likely
4. very likely

**Q16**: If your home had elevated radon levels, do you think this would increase your personal risk of getting lung cancer?

1. not at all
2. not much
3. average
4. much
5. very much

Base: Total, n=3,000 in %
27% of respondents have heard that radon concentrations can be measured inside buildings, and among people aged 65 and over, the figure is as high as 35%.

Knowledge radon measurement

Yes, I have heard that you can measure the radon concentration in the buildings

No, I haven't heard that you can measure the radon concentration in the building.

Q17: Have you ever heard that you can have the radon concentration inside buildings measured?

Base: Total, n=3.000/236/569/509/511/582/593, in %
The most frequently mentioned countermeasure is to find out more about what radon actually is and to what extent one's own area is affected.

**People who know that they live in an area with elevated radon concentration:**

**Potential countermeasures for radon concentration**

<table>
<thead>
<tr>
<th>Countermeasure</th>
<th>Frequency</th>
<th>Base: Total, n=41, in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have informed myself about what radon actually is.</td>
<td>47</td>
<td>11</td>
</tr>
<tr>
<td>I have informed myself to what extent our area is actually affected by radon.</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>I ventilate my living space more often and better.</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>I have informed myself about how to measure the radon concentration in my own living space.</td>
<td>29</td>
<td>9</td>
</tr>
<tr>
<td>I have informed myself about how to reduce the radon risk in my own living space.</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>I ventilate my basement / cellar more often and better.</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>I have asked around in the neighbourhood and among acquaintances if they know about a radon risk in our area.</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Radon remediation measures have already been carried out on my house / flat.</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Q20: What have you done / are you doing since you know that you live in an area with elevated radon concentrations?
31% of respondents (top 2 box) think that the effects of radon on health can be very serious. However, only a few think that radon affects them personally.

Radon perception

The effects of radon on health can be very serious. 38 5 25 19 12
Radon is a hazard that affects everyone. 31 5 13 27 13 11
Radon is a hazard for future generations. 37 10 28 14 8
The risk from radon only affects certain regions and is therefore not relevant for the majority of the population. 37 5 9 28 15 6
Possible effects of radon on my health only occur far in the future. 43 8 27 14 5

Radon is also used as a healing agent 59 7 4 12 8 10
Radon is an issue that is personally relevant to me. 19 24 24 12 21 7
Radon is very threatening to my family. 30 20 21 10 21 5
Radon is very threatening for me personally. 30 20 21 22 5 5

Q23: How much do you think the following statements are true? Please use the scale from 1 "not at all true" to 5 "completely true".

Base: Total, n=3.000, in %
The vast majority have never thought about radon measurement.

Q26: What is your attitude towards the issue of radon measurement in the home? Please select the statement that applies most to you. (multiple answer)

- I have never thought about it (apart from today’s questioning): 87%
- I am thinking about it, but I haven’t decided yet.: 13%
- I will not have my living space tested.: 8%
- I will do a test but have not done it yet.: 4%
- I have already had a radon measurement done.: 1%
- I have already ordered a test set / commissioned a radon measurement.: 0%

Q27: Has anyone in your private or professional environment already carried out / had carried out a radon test?

- Yes, someone in my private / professional environment has carried out / had carried out a radon test.: 35%
- No.: 63%
- I am not sure.: 2%

Base: Total, n=3.000/236/569/511/582/593, in %
21% of respondents think it would be very expensive to fix a radon problem in their own home

Q33: Putting together everything you now know about radon, how much do you agree with the following statements? Please use the scale from 1 "strongly disagree" to 5 "strongly agree".

Base: Total, n=3.000, in %
In particular, people aged 18-24 agree with the statement that it is important to know if there are health risks in the living space that one did not know about before.

<table>
<thead>
<tr>
<th>Attitude Radon (Top2-Box)</th>
<th>TOTAL</th>
<th>18-24 Jahre (A)</th>
<th>55-64 Jahre (E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>By informing myself comprehensively, I can take the right precautions against high radon exposure in the rooms myself.</td>
<td>![43]</td>
<td>![49]</td>
<td>![37]</td>
</tr>
<tr>
<td>I can reduce my risk of developing lung cancer by testing my living space for possible radon exposure and carrying out remediation measures.</td>
<td>![30]</td>
<td>![43]</td>
<td>![23]</td>
</tr>
<tr>
<td>It is important for me to know if there are health risks in my living space that I did not know about before.</td>
<td>![57]</td>
<td>![65]</td>
<td>![52]</td>
</tr>
<tr>
<td>I have so many other things on my mind that I can’t worry about radon at the moment.</td>
<td>![26]</td>
<td>![26]</td>
<td>![24]</td>
</tr>
<tr>
<td>I don’t think radon has that big an effect on personal risk of getting lung cancer.</td>
<td>![41]</td>
<td>![53]</td>
<td>![35]</td>
</tr>
</tbody>
</table>

Q33: If you put together everything you now know about radon, how much do you agree with the following statements? Please use the scale from 1 "strongly disagree" to 5 "strongly agree".

Base: Total, n=3,000/236//582, in %
Overall Conclusion

- German population: Diffuse awareness of and knowledge on radon
- Qualitative and quantitative approaches show slightly different pictures of radon awareness in Germany
- Combination of both methodological approaches provides a good overall impression