

## **The Potsdam Radon Communication manifesto**

### **Abstract:**

Risk communication efforts to mitigate the second cause of lung cancer worldwide (after tobacco smoking) – the radioactive gas radon in buildings – are often ineffective. Therefore, new European legal requirements bind member states to prepare communication strategies to “... increase public awareness and inform local decision makers, employers and employees of the risks of radon...” (Council directive 2013/59/EURATOM, ANNEX XVIII / (10)). This manifesto is written to support states to prepare an effective and efficient communication strategy and to avoid the main pitfalls in radon communication. It is based on the discussions that took place at a Workshop on Radon Risk Communication, organized by the German Federal Office of Radiation Protection (BfS) and hosted by the Institute for Advanced Sustainability Studies IASS in Potsdam, Germany from 8 to 10 of October 2019. The authors present a strategic view on the concrete measures that may be taken by authorities, experts and scientists to communicate the risk of radon to human health and to promote radon protection actions more effectively.

### **Keywords**

Radon, Cancer, Risk Communication

On 8-10 October 2019 we met as a group of scientists and regulators who hold competences in radon risk research and radon mitigation at international, national and subnational levels. The purpose of the meeting was to share best communication practice regarding the risks that radon poses to human health, as well as to identify main pitfalls in motivating populations at risk to take protective actions.

Radon is a naturally-occurring radioactive gas that is present in homes throughout Europe (Tollefsen, Cinelli, Bossew, Gruber, & De Cort, 2014). It is the second cause of lung cancer (ICRP, 2014; WHO, 2009). Although radon threat is often communicated to populations, too many people still neglect this “silent killer” in their homes, which leads to premature deaths. These fatalities are both tragic and preventable.

Previous efforts to communicate the risks of radon and behavioural recommendations to avoid them, have been limited in various aspects. They concentrated on increasing awareness and risk perception only, without addressing barriers and behavioural recommendations. Efforts also failed to take into account target group specific differences with regards to individual risk, individual barriers and needs, information processing, media use and reachability, and rather used a “one size fits all approach”. However, as behavioural theories show, individual behaviour is influenced by many factors beyond awareness and risk perception, such as attitudes, subjective norms (injunctive and descriptive), perceived behavioural control or self-efficacy, individual perceptions about behavioural consequences as well as factors facilitating or inhibiting a behaviour.

Against this background, communication strategies should first assess these factors within the target group and adjust the communication strategies to the most relevant factors. Furthermore, effective radon risk communication should aim at influencing the following aspects: empowerment (helping people at risk to make informed decisions related to radon, e.g. installing radon mitigation system in a new energy efficient homes); enlightenment (making people able to understand radon risks and become “risk-literate”, e.g. understand which geographical areas and which types of buildings are at risk); trust building (assisting radon risk management institutions to generate and sustain trust, e.g. safety and health authorities); conflict resolution (assisting radon risk management to involve major stakeholders and affected parties to take part in the radon risk management process, e.g. building industry).

The following recommendations, which are based on 50 years of risk communication and health communication research and practice, must be implemented to improve radon risk communication (O. Renn, & Beninghaus L., 2013).

### **1. Governments and radon risk communicators need to convey science-based communication programs**

Radon communication needs to be evidence-based (e.g., based on the qualitative and quantitative empirical data, surveys, experiments), theory-based (e.g., drawing from empirically-supported theories of health behavior, behavior, information processing, risk perception and risk communication) and strategic (e.g., based on formats and methods that have been proven to reach its preconceived objectives). It should not be based on gut feelings and subjective opinions on “what may work”. In addition, governments and scientists (both natural and social) need to link up to produce and communicate robust science to the people. We call for an interdisciplinary approach in radon risk communication, an alliance of scientists (e.g. scholars from natural sciences like medicine or construction, but also social scientists) and in-house government assessors and managers to produce top quality information that will be the basis of their communications. Communicators also need to take stock of public perception, motivations, expectations and concerns, which are likely to differ from experts.

### **2. Radon must be re-framed, from “a natural radioactive gas” to “indoor air pollution”**

Most people do not relate to radon as a risk. In typical situation, radon is invisible, odourless and tasteless and, when at all considered, it tends to be perceived as natural, therefore not as a threat. Due to this, the perception of radon risk is often attenuated. Risk communicators need to draw attention to radon by “indoor air pollution” of which radon is one major cause. People care about living in a safe environment and need to be made aware that their homes are not entirely safe but can be made safer when specific procedures are followed. Moreover, radon communication should be included in other strategic programs (e.g. cancer strategies, anti-tobacco action plans, sustainability programmes, energy saving homes).

### **3. Policy-makers must take the lead and engage with experts and other stakeholders**

Governments need to engage in championing public health and raising attention to the seriousness of this risk. Because different authorities have shared responsibilities in radon related issues, e.g. ministries of health, ministries of labour, radiation protection regulators, they should develop a radon action plan together. Policy-makers should engage with radon experts, academia and researchers from the social sciences and humanities for all communication programs. They should not wait for third parties to push for action. They should also refrain from outsourcing their communications to public relation agencies and consultancy firms that have very little knowledge of the issues. Communication should be an integral part of all steps in a radon action plan, from radon mapping to radon mitigation actions. Risk assessment, risk mitigation and risk communication should well-integrated.

#### **4. Communications need to be inclusive, coherent and consistent**

Communicators need to include a range of radon stakeholders, and representatives of civil society. They need to partner with local / regional authorities, inform people at risk to perform measurements and remediate by themselves if they wish so. We call for a more systematic liaison across policy areas (e.g. Environment and Health) as well as levels of government to co-ordinate and harmonise risk communications. This is important as potential discrepancies create a sense of lack of competence and distrust. Equally important is the consistency on the communication regarding what may constitute a negligible, tolerable or unacceptable level of risk. For example, levels of risk need to be formulated sensitively. It is not acceptable that citizens feel confused about the significance of reference levels (e.g. 100 Bq/m<sup>3</sup> or 300 Bq/m<sup>3</sup>), which may also vary across jurisdictions.

#### **5. Communication needs to be sustained over time**

Communicators must sustain and repeat their messages and campaigns. Key yearly events like the “European Radon Day“ may help to keep the issue on the agenda as one-off occurrences will not be enough. Regular engagement with key stakeholders, especially the indoor air quality community as well as interested parties, with local politicians and opinion leaders will play a crucial role to avoid creating a communication vacuum. Effects of radon communication campaigns need to be systematically measured, improved and pitfalls and lessons learned openly shared.

#### **6. Interactive tools may enhance communication**

Visual tools such as maps and apps may be used to support communication. Maps tend to draw people’s attention and are therefore popular. To be effective these tools need to be truly interactive and offer the relevant level of accuracy to support well-informed decisions. Poorly designed tools may confuse or mislead people and as such should be discouraged. For instance, maps that highlight an entire region as a “high risk” or “low risk” area are misleading because the risks are not equally distributed across an area.

#### **7. Dedicated training programmes must be developed**

Beyond information critical interested parties must engage with society on a deeper level via training programmes. Well-trained communicators may become “ambassadors” and “multipliers”. A particular emphasis should be put on the building construction area. Science

labs or summer schools can serve as useful formats. Finally, radon can be part of risk education in schools, especially in areas where the problem is more acute. Moreover, since radon experts are one of the main communicators, basics of risk communication in curriculums or/and workshops for radon experts are needed.

### **8. Support social sciences and humanities research in the radon field**

Research to support and develop evidence-based radon communication programs is scarce. National radon action programs need to support research on the interaction between radon risk managers and society. For instance, research on psychological barriers, research on radon media content and media framing, research on message appeals, large representative surveys to identify target-specific knowledge gaps, radon related perceptions, barriers, and behaviours. It should be investigated how governments can support citizen science projects for radon and establish radon research networks, e.g. data sharing, collaboration.

The signatories:

Prof Dr Frederic Boudier, University of Stavanger, Norway

Dr Tanja Perko, Belgian Nuclear Research Centre and University of Antwerp, Belgium

Prof Dr Ragnar Lofstedt, Kings College London, U.K.

Prof Ortwin Renn, Institute of Advanced Sustainability Studies, Germany

Prof Dr Constanze Rossmann, University of Erfurt, Germany

Prof Dr David Hevey, School of Psychology, Trinity College Dublin, Ireland.

Prof Dr Michael Siegrist, ETH Zurich, Department of Health Sciences and Technology Switzerland

Dr Wolfgang Ringer, president of the European Radon Association (ERA)

Christiane Pözl-Viol, Federal Office for Radiation Protection, Germany

Alison Dowdall, Environmental Protection Agency, Ireland

Ivana Fojtíková, National Radiation Protection Institute (SURO), Czech Republic

Dr Fabio Barazza, Federal Office of Public Health, Switzerland

Dr Bernd Hoffmann, Federal Office for Radiation Protection, Germany

Anja Lutz, Federal Office for Radiation Protection, Germany

Dr Stephanie Hurst, Saxon State Ministry of the Environment and Agriculture, Germany

Dr Christiane Reifenhäuser, Bayerisches Landesamt für Umwelt, Germany

## References:

- Bostrom, A., B. Fischhoff, and M. G. Morgan. 1992. "Characterizing Mental Models of Hazardous Processes: A Methodology and an Application to Radon." *Journal of Social Issues* 48: 85–100
- Finnegan, J. R., & Viswanath, K. (2008). Communication theory and health behavior change. The media studies framework. In K. Glanz, R. K. Rimer, & K. Viswanath K (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 363–387). San Francisco, CA: Wiley & Sons.
- Fisher, A. and L. Sjoberg. (1990) Radon Risks: People's Perceptions and Reactions. In eds. S. Majumdar, R. Schmalz and E. Miller. *Environmental Radon: Occurrence, Control and Health Hazards. Philadelphia: The Pennsylvania Academy of Science*
- ICRP. (2014). Radiological Protection against Radon Exposure. ICRP Publication 126. *Ann ICRP*, 43(3).
- WHO. (2009). *WHO handbook on indoor radon: a public health perspective; Edited by H. Zeeb, and F. Shannoun, 94 p.*
- Noar, S. M. (2006). A 10-year retrospective of research in health mass media campaigns: Where do we go from here? *Journal of Health Communication*, 11, 21–42.
- Renn, O. und Benighaus, C. (2013). Perception of Technological Risk: Insights from Research and Lessons for Risk Communication and Management. *Journal of Risk Research*, Vol. 16, Nos. 3-4 (2013), pp. 293-313
- Rossmann, C. (2015). Strategic health communication: Theory- and evidence-based campaign development. In D. R. Holtzhausen (Hrsg.), *Routledge Handbook of Strategic Communication* (pp. 409–423). New York: Routledge.
- Sjoberg, L. (1989) Radon Risks: Attitudes, Perceptions and Actions. Prepared for EPA's Office of Policy, Planning and Evaluation. *Stockholm: Center for Risk Research, Stockholm School of Economics.*
- Tollefsen, T., Cinelli, G., Bossew, P., Gruber, V., & De Cort, M. (2014). From the European indoor radon map towards an atlas of natural radiation. *Radiation Protection Dosimetry*, 162(1-2), 129–134, 110.1093/rpd/ncu1244. doi:10.1093/rpd/ncu244
- Weinstein, N., P. Sandman, and N. Roberts. (1989) Public Response to the Risk from Radon 1988-1989. Prepared for the New Jersey Department of Environmental Protection. New Brunswick, NJ: *Department of Human Ecology and Psychology, Rutgers University*

Acknowledgement: We would like to thank Dr T. E. van Deventer, Department of Public Health, Environmental and Social Determinants of Health, World Health Organization, Geneva, Switzerland for her contribution to the discussion and valuable comments to this manifesto.