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# Radon hazard vs. radon risk – consequences for radon abatement policy

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Exposure to indoor radon (Rn) is recognized as a health hazard which may cause several 100,000 lung cancer fatalities per year world-wide. Physical causes are Rn generation as part of the decay chains that originate in ubiquitous uranium and thorium and its transport through the natural to the built environment, where it can infiltrate indoor air. Generation and transport of Rn constitute geogenic Rn hazard. Its geographical distribution reflects the ones of the properties of the media in which the processes occur, namely their geochemistry and physical properties such as porosity, permeability and humidity. By linking to measured indoor Rn concentration, geogenic hazard can be transformed into the expected indoor Rn concentration in a hypothetical house at a location or the probability that in the house a Rn threshold is exceeded.

Hazard turns into risk if somebody is exposed to the hazardous agent. Given a certain amount of hazard, the risk results from conditions which enable exposure (defining vulnerability and susceptibility to the hazard) and the presence of people who are actually exposed. While hazard yields a probability that somebody exposed suffers a detriment, risk quantifies the size of the detriment, e.g. the expected number of Rn induced lung cancer fatalities per unit area. Elevated risk can occur also if the individual probability of detriment is low, if the number of exposed persons is high.

Rn abatement policy which through regulation aims to reduce the detriment, should respond differently to hazard and risk. In the former case, it should reduce the probability of individual high exposure occurring, by remediation, or avoiding it to occur, by preventive action. Responding to the latter means reducing collective exposure.

So far, policy has mainly focused on the first, i.e. hazard reduction, while comparatively less attention has been given to the second, although the overall detriment to society depends on it. Although Rn regulation has already been developed extensively in Europe, discussion of the aspect of collective risk reduction seems to be in the beginning only.

In this presentation, we outline the problem by showing the difference between hazard and risk and addressing existing Rn abatement strategies.