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Review of public information programmes to enhance home radon screening uptake and home remediation

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Aim

- Commissioned by the EPA Office of Radiological Protection to review the empirical research literature on the effectiveness of local awareness programmes regarding:
 1. Home radon testing uptake
 2. Home remediation rates
- Position the RPII programmes in the context of international evidence
- Consider the psychology of risk perception

Radon

- Radon health threat can be managed
- Levels of radon testing and home remediation = low
- Despite high levels of awareness of radon (typically above 70% of the population report being aware of radon), many underestimate the seriousness or long-term health effects of radon exposure.
- Furthermore, even when individuals are informed that their homes have high radon levels, remediation rates are low.
 - RPII report that of householders who have tested their houses and found them to be high, less than 25% actually go on to remediate (Fenton, 2011).
 - Among those who received a **free radon test** informing them that their household levels were high, just over 1/3 planned any action (Field et al. 1993)

Information → Behaviour

- Radon information programmes based on an assumption that individual will act rationally in relation to the information: once you tell people that there is a radon threat...
- they will be motivated to test to see if they personally are at risk from the threat.....
- they will test....
- they will then act to remediate if the test indicates a threat.....
- they will re-test to ensure that the remediation was effective

Steps

- I am **exposed** to the information
- I **attend** to the information
- I am **interested** in the information
- I **understand** the information
- I **believe** that there is a threat: the information must be perceived as being **credible**
- The threat is **comprehensible**: I understand the threat
- I **perceive** it as a possible **risk** : the threat may affect me (I may be **susceptible**) and it may have very negative health consequences for me (it is **severe**)
- I **believe** that the threat level can be assessed
- I **know** how to get the threat level assessed
- I **want** to get the threat level assessed
- I **act** to get the threat level assessed: **test**
- I **understand** the results
- I **perceive** that **I am at risk** (I am susceptible to a severe negative outcome)
- I **want** to reduce this risk
- I **know** how to reduce this risk
- I **act** to reduce the risk: **remediate**
- I **act** to confirm that the risk has been managed: **re-test**

Complex process

- Knowledge, beliefs, feelings, motivation & behaviour
- Even where there is awareness of radon, apathy rather than a sense of urgency tend to be reported (Weinstein et al. 1986)
 - when offered radon tests for free less than 40% of the residents in a high radon area availed of the offer (Hartman, 1987)
- Radon threat characteristics do not give immediacy for managing it

Radon threat

- **Low objective level** of risk:
 - Radon risk perceived as being so low that it is not understood or appropriately acted upon.
 - For low levels of risk, we tend to dismiss the risk as being too small to worry about.
- **Absence of sensory cues** to alert people to the risk:
 - Cues help motivate behaviour = radon risk is in essence “out of mind”.
- **Natural** risk:
 - we perceive man-made technological threats to be more risky than natural risks.
- **Benign** risk :
 - people have lived with the risk, sometimes for many decades, without experiencing any side effects/symptoms.
- **Far removed** effect is from the initial exposure:
 - lung cancer will develop decades later and no early symptoms to act as cues = easy to delay action.
 - deaths are relative *undramatic*, occur singly, and can be accounted for using other explanations
- **Inequitable** risk
 - Radon risk is not equitable, which makes it harder for us to accept.
- **Emotional identification** with our homes:
 - it is hard to accept that our home (our physical and psychological place of safety and security) is a threat to our health

Risk Perception

- Risk perception is a complex psychological process of meaning making by the individual
- Risk perceptions can influence behaviour if we perceive a credible threat to our health
- Risk perception is subject to numerous unconscious cognitive and emotional biases that influence how we process radon information
 - No incidents of people dying from radon, radiation comes from nuclear power plants; unrealistic optimism, fear of having an unsafe home.
- These biases act to minimize our sense of risk
- Risk perception reflects not only personal experiences and circumstances, but is highly influenced by **social context**.
 - People look to their social networks for information and guidance, particularly their trusted sources

Health Threats

- Health threat information is processed cognitively and emotionally
- Respond **defensively** to health threat information that aims to instill motivation for behaviour
 - downplay the seriousness of the health risk, question the accuracy of the threatening information
- Individuals can process information systematically with a bias towards maintaining the status quo, which will inhibit their behaviors to test or remediate.
- Public health information programmes have to consider the pervasive and automatic biases in health threat information processing
- In order to get people to adopt radon protective behaviours it is essential that they perceive the recommended action as effective in reducing the threat

Knowledge & Testing

- Irish data show very high levels of awareness (86%), but very low level of concern: only one in three were concerned about radon in their home (RP11, 2013)
- In high radon area, although the participants had adequate knowledge of radon, less than half of those accurately recalled their radon level (Ryan et al. 1999)
 - only 9% consulted a remediation professional and 6% completed home modification.
- RP11 (2011): 25%
- Chow et al. (2011) audit of the England's radon programme: among those houses identified as having high radon levels 10-20% reported some form of remediation
- ?Objective verification of remediation?
- ?Re-test to ensure remediation was effective?

Barriers

- Why not test (RP11, 2010)?
 - lack of awareness of threat
 - lack of awareness of how to test
 - threat is not relevant to their home
 - lack of urgency over threat
 - lack of importance placed on it by peers
 - role of state fiscal responsibility
- Why not remediate?
 - lack of concern
 - cost
 - (RP11, 2013; Riesenfeld et al. 2007; Wang et al. 1999).

Summary of Programmes

- Increase knowledge and intentions
- Little evidence of effect on actual testing or remediation
- Purchasing a kit only rarely results in eventual remediation
- Delivering radon programmes targeted on the basis of whether the individual has decided to test or remediate
- GP practice may be effective
 - make the *health threat* of radon more visible and salient
- Methodological limitations restrict the strength of conclusions that can be drawn in relation to the efficacy of the radon information programmes
- The lack of routine objective assessment of radon testing, remediation and re-testing is particularly problematic

RPII programmes

- **The RPII awareness programmes are broadly aligned in terms of content, delivery and effectiveness with those reported in the international literature.**
- Adhere to the evidence-based principles for communication about environmental health risks and the WHO recommendations for risk communication.
- Their level of impact on radon testing and remediation is comparable to those reported in the peer-reviewed empirical literature

Comparable efficacy

- The Radon Awareness programmes aim: (1) get people to test and (2) of those with a high level, get them to remediate.
- People often don't attend screening for fear of finding out that they are at risk for negative health outcome and that will have negative implications for one's sense of self
 - Radon: false belief that remediation is considerably more costly or disruptive than is actually the case (RP11, 2010)
- Meta-analysis of a broad range of communication interventions that used community-wide mass media in the US to promote breast or cervical screening = change behaviour in approximately 4% of women (Snyder et al. 2004).
- Community based health promotion programmes, comprising awareness and using community coalitions, have limited impact
 - reviews report that many changes were of a magnitude of less than 5% and generally were not larger than 15% (Merzel & D'Afflitti, 2003).

Information Programmes

- Information will only act as driver of behaviour if it can overcome the numerous biases that people have towards processing radon risk information.
- When risks threaten, some cognitive and emotional mechanisms push people toward action; others push them toward inaction.
- **The threat from radon can easily be downplayed to justify inaction.**
- Radon threat is distal, uncertain and only occasionally in the public discourse, then actions to alleviate threat can be postponed easily.
- Furthermore, in response to radon threat, people believe that they could at a later point undo damage they have done to themselves by inaction at present or in the past (Smith, 2001)
 - serves to reduce the need to remediate immediately.

Summary

- Decades of health psychology research indicate that even well-designed well delivered information programmes are seldom adequate to bring about appropriate protective behaviour (Weinstein, 1987).
- What is realistically achievable by mass media interventions?
- Doyle et al. (1990) concluded that
- “..any radon programme targeted at the general population which relies only on information, awareness and voluntary testing is likely to fail. At the very least, the likely credible mitigation resulting from this program has been so small as to suggest such programs may be a very expensive way for society to achieve radon mitigation.” (p. 37)
- They suggest that governmental regulation may be preferable in this context.
- WHO (2009): **convincing policy makers to take action through regulatory means may be more effective than risk communication messages targeted at the general public.**

State vs. Individual Action

- Given the low levels of credible remediation resulting from information programmes promoting voluntary testing and remediation, **direct governmental regulation may be preferable** in this context.
- Mandatory government regulation could take a number of forms:
 - Each home in high risk area must get tested and must remediate if test exceeds designated level.
 - Each home in high risk area must get tested, but leave remediation at householder's discretion
 - Each home must have test result prior to sale
 - Each home must have test result and evidence of remediation prior to sale
- The effectiveness of programmes designed to induce households to take action to reduce risk will be influenced by whether **they accept the risk and are willing to assume responsibility for the risk.**
- RPII (2013): some people believe that **if radon is a health threat then the responsibility lies with the state to address it: such a belief promotes individual inaction.**

Visibility

- Radon is an invisible threat and consequently can be negated.
- Make threat salient: monitors in house gives a presence to the radon threat
- Provides a visual or auditory aid to remind people to behave in a manner that might otherwise be forgotten (McKenzie-Mohr, 2000).
- A visible marker on one's house (e.g., sticker on window provided by testing company) to indicate that the house was tested sends a tangible signal to the community that they have tested for radon.
- The more such markers are visible, it will mean that **not testing becomes deviant** from the social norm: people may not be comfortable being perceived as the unusual one who is perceived to be willing to put their family at risk by not testing.
- **Social competition and herding influences may have a strong impact on testing and remediation behaviour.**

Stage-match programmes

- Weinstein et al. (1998) examined how to best facilitate movement between two different transitions:
 - to shift people from being undecided to test to deciding to test
 - Risk
 - to shift people from deciding to test to actually ordering a test
 - reduced barriers to action by providing info. about DIY test kits and a test order form
- Consequently **message segmentation may prove more effective than an approach that considers the target audience to be a singular population**
- Three distinct groups could be the focus on the interventions:
 - get non-motivated individuals motivated to test
 - get motivated individuals to test
 - get motivated individuals remediate
- Focusing efforts on the motivated individuals may prove more effective in terms of helping meet the aims of increasing actual testing and remediation.
- Although from a public health perspective information provision to the general population should continue, perhaps this aspect could be downscaled to target resources at the motivated groups.

Conclusion

- Public health information programmes have not just got to provide information on risk and its management, they need to overcome pervasive and automatic biases in information processing, which will compromise the efficacy of any information programme
- Given the psychological barriers noted in this review, placing the responsibility solely on the individual householder is not supported: **increased governmental regulation is required.**
- **Combining this with high quality information programmes that target householders at different stages of radon testing motivation is recommended**