

Household Radon Exposure In Patients Attending A Rapid Access Lung Cancer Clinic

BACKGROUND

- Radon is a colourless, odourless radioactive gas, which is naturally released into the atmosphere from uranium degradation in rocks and soil
- Along with cigarette smoking and asbestos, radon is classed as a level 1 carcinogen by the World Health Organisation¹
- Radon has a half-life of 3.8 days, allowing it to diffuse through soil into the air and accumulate in buildings where it can reach dangerously high concentrations
- It is inhaled into the lungs and decays with the emission of alpha particles bombarding bronchial epithelium and causing DNA damage
- Household radon exposure delivers a larger dose of ionizing radiation to the public than any other source
- Long term radon exposure is the second commonest cause of lung cancer in smokers, and the commonest cause amongst never smokers²
- In a survey of 29 OECD countries, Ireland was found to have the 8th highest average radon levels at 89 Bq/m³, estimated to cause 13% of lung cancers per year
- Radon is however a worldwide problem and is thought to account for 21,000 lung cancer cases in the United States each year³.
- There is a strong synergism with smoking exposure, with current and former smokers at highest risk of a radon induced lung cancer

STUDY

- Galway (West of Ireland) has High Radon Areas (Fig 1)
- A rapid access lung cancer evaluation service (RALC) is provided by Galway University Hospital
- Using the RALC we sought to measure:
 - Household radon exposure in 50 consecutive patients attending RALC
 - Percentage of houses above the national reference range (200Bq/m³) requiring remediation
 - Patient awareness of radon as a lung cancer risk
 - Viability of using the RALC as a radon screening service

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Ethical approval by Ethics Committee of Galway University Hospital

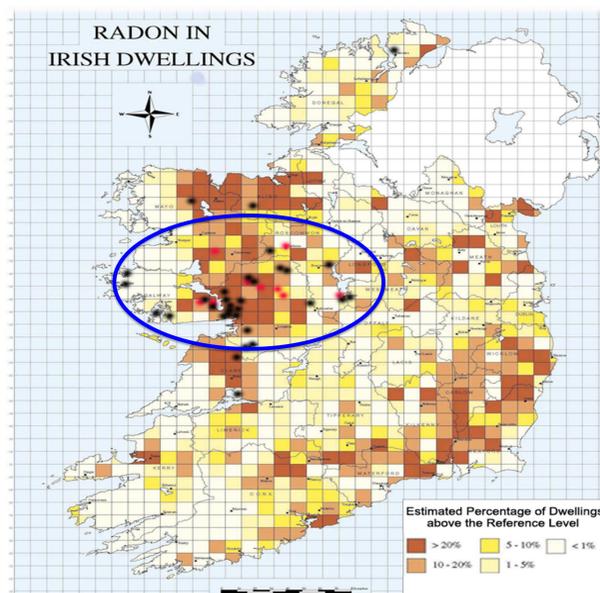
RESULTS

Table 1: Baseline Characteristics (n=42)

Male	52%
Mean age	64.2 years (38-86)
Current smokers	19%
Former smokers	60%
Mean pack years	32.2 years
Never smokers	21%
Consecutive years in household	26.9 years (5-60)

- 50 consecutive patients attending RALC agreed to partake in the study.
- 42 (84%) completed the study
- Only 19% were current smokers but 79% were ever smokers
- 21% had high radon levels
- There was a very poor understanding of radon risk

Fig. 1



REFERENCES

- WHO handbook on indoor radon: a public health perspective, WHO 2009
- Protecting people and families from radon: a federal action plan for saving lives [monograph on the Internet]. Washington, DC: U.S. Environmental Protection Agency [cited 2011 Dec 12];http://www.epa.gov/radon/pdfs/Federal_Radon_Action_Plan.pdf.
- Paula M. Lantz, PhD, MS, MA, David Mendez, , and Martin A. Philbert, Radon, Smoking, and Lung Cancer: The Need to Refocus Radon Control Policy. AM J Public Health. 2013 Mar, 103(3): 443-7
- National Radon Control Strategy, Ireland 2013: <http://www.enviroment.ie/en/Publications/Enviroment/EnviromentalRadiation/FileDownload,35484,en.pdf>

Table 2: Radon Measurements

Median radon levels	58 Bq/m ³ (16-4189)
Percentage >200 Bq/m ³	21%
Ever Smokers (mean radon)	91 Bq/m ³
Lung cancer cases (mean radon)	14% (80Bq/m ³)
Aware of radon & lung cancer	5%
Previous testing	17%
Lost to follow up	16%

CONCLUSIONS

- Our study highlights a low rate of radon testing and scant awareness of radon as a lung cancer risk, despite being conducted in areas of targeted media campaigns in the past
- The percentage of houses above the national reference range was consistent with larger surveys of the area previously published
- Patients were receptive to radon information and study completion rates were high (82%)
- Some experts have advocated targeting testing in those most at risk, i.e current and former smokers³
- Tailoring advice in radon remediation and smoking cessation should increase the proportion of homes that remediate and lower overall lung cancer risk
- Many governmental bodies have called for combined public health campaigns⁴, and greater involvement of health professionals in delivering this message is vital
- Rapid Access Lung Cancer Clinics have an important role, and provide a framework to reduce radon exposure and the incidence of radon induced lung cancer