



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Radon a manageable risk to public health in Ireland

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Outline

- Lung cancer is the health concern
- Ireland - a high radon country
- Primary prevention first
 - Building regulations
 - No smoking in the workplace
- Smoking cessation services
- Identify and remediate
 - OPW looking after public buildings - schools and some workplaces
 - Local authority looks after some homes

Public Health Risk Assessment regarding Radon

- Epidemiology
- Numbers re radon - all
- Numbers re lung cancer
- Cause of lung cancer
- Smoking

Radon attributable lung cancer- UK data*

- Causes of lung cancer
 - Smoking 83%,
 - Radon only 0.5%
 - Smoking and Radon in combination 2.8%
 - Other causes (ETS, asbestos) 13.6%
- => Reduction of radon exposure has potential to avoid 3.3% of the total number of lung cancer cases (0.5 + 2.8%)
- Note 85% of radon related lung cancers occur in smokers or ex-smokers

*Gray A, Read S, McGale P, Darby S. Lung cancer deaths from indoor radon and the cost effectiveness and potential of policies to reduce them. BMJ 2009;338:a3110 doi:10.1136/bmj.a3110

Lung cancer & radon in Ireland

- 1910 cases of lung cancer per annum (annual average 2007-2009)*
- Radon attributable cases
 - EU average 9% of lung cancer, 2% all cancers**
 - WHO range of 3-14% ~ 57-267 cases p.a.
 - NCRI RPII estimates 150-200 cases annually
- Ireland's high average annual radon concentration 89Bq/m^3 → high dose
- Irish smoking rates
- Radon is an important public health issue

*Source: NCRI, Darby 2005

Factors affecting human exposure

Public Health risk assessment considers factors under the following components of a completed pathway:

- Source
- Pathway
- Receptor

Source factors

- Radon gas from the ground - geology of area and climatic factors
- Indoor
 - Building construction
 - Ventilation (seasonal)
 - Building extensions
 - Changing windows
- Time spent in settings - in homes/ workplaces/ schools/residential institutions

Pathway and Receptor Factors

- Pathway
 - by inhalation
- Receptor
 - smoker or not

Risk of health effects

Related to:

- Dose
 - Level of radon
 - Length of exposure
- Synergistic effect with smoking
- Other exposures (asbestos, ETS)
- General health of individual
- Past medical history or family medical history - personal or genetic susceptibility

Risk of Lung Cancer

| Radon Concentration Bq/m³ | Lifelong Non Smoker to age 75 years | Smoker |
|---|--|---------------|
| 0 | 0.41% | 10.1% |
| 100 | 0.47% | 11.6% |
| 200 | 0.55% | 13.0% |
| 400 | 0.67% | 16.0% |
| 800 | 0.93% | 21.6% |

Radon multiplies the adverse effect of smoking

- Non Smoker, little radon exposure - LEAST RISK
- Non Smoker, some radon exposure - SOME RISK
- Smoker, little radon exposure - INCREASED RISK
- Smoker with radon exposure - GREATEST RISK

Radon a manageable risk to public health

- Risk management at population level
 - Strategy to maximise primary prevention
 - Ensure effective secondary prevention system in place
- Risk management at individual level
 - Secondary prevention (radon testing) identifies individuals with their own personal risk factors so ethical obligation to provide appropriate risk assessment and risk advice based on best advice available
 - Smoking cessation

Interventions to manage risk

- Stop Radon at source
- Tobacco control - Ireland the first smoking free zone
- Response to those who have been exposed

Stop at source

- Radon gas will still vent

So

- Stop it getting into the building
 - Primary prevention - passive barrier
 - Best option as prevents/reduces risk of exposure

However

- Not available for existing buildings
- Quality of installation affects effectiveness

Stop at source

- For existing buildings
- Vent it back out of the building
 - Secondary prevention - remediate, put in sump, activate a pump/fan

However

- Depends on personal decision to test, and if increased levels to remediate
- Identifies people who have been exposed to high/extreme levels - must have appropriate response to their needs (ethical obligation)

Those who have been exposed

- Change the risk of health effects
 1. Stop ongoing exposure reduces risk
 2. Stop smoking reduces the risk
 3. Early detection (screening for lung cancer) - no screening methodology agreed yet but some developments in recent years may provide future benefits