Radon a manageable risk to public health in Ireland

Dr. Kevin Kelleher,
Assistant National Director-
Health Protection,
Health Services Executive
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/m³ → 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

<table>
<thead>
<tr>
<th>Radon Concentration Bq/m³</th>
<th>Lifelong Non Smoker to age 75 years</th>
<th>Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.41%</td>
<td>10.1%</td>
</tr>
<tr>
<td>100</td>
<td>0.47%</td>
<td>11.6%</td>
</tr>
<tr>
<td>200</td>
<td>0.55%</td>
<td>13.0%</td>
</tr>
<tr>
<td>400</td>
<td>0.67%</td>
<td>16.0%</td>
</tr>
<tr>
<td>800</td>
<td>0.93%</td>
<td>21.6%</td>
</tr>
</tbody>
</table>
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