

# Communicating Effective Radon Risk Information : a personal viewpoint

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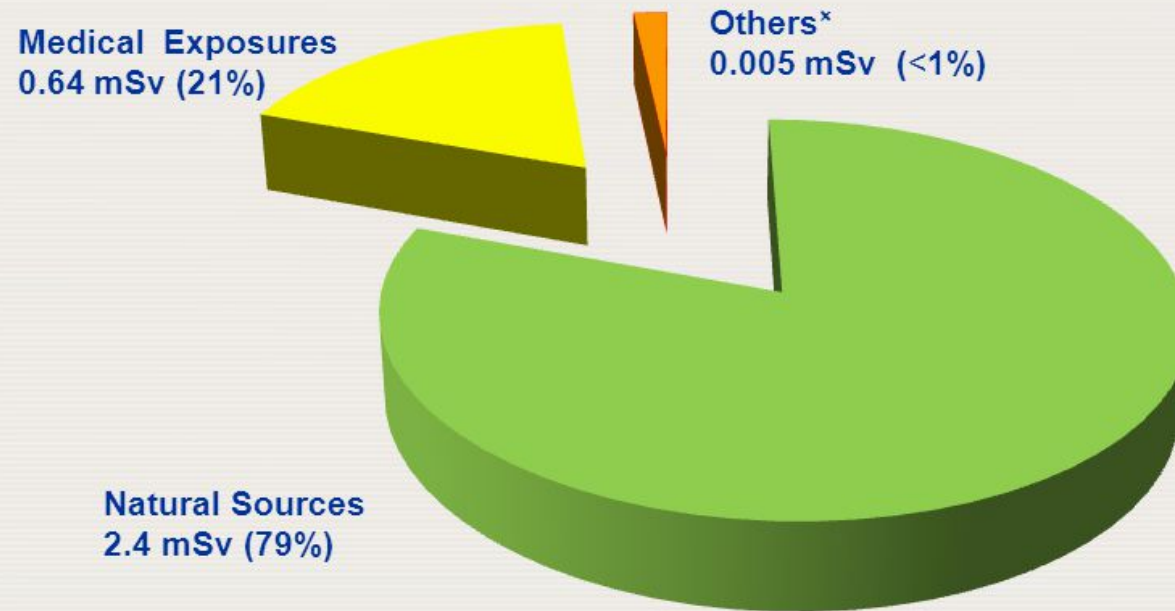
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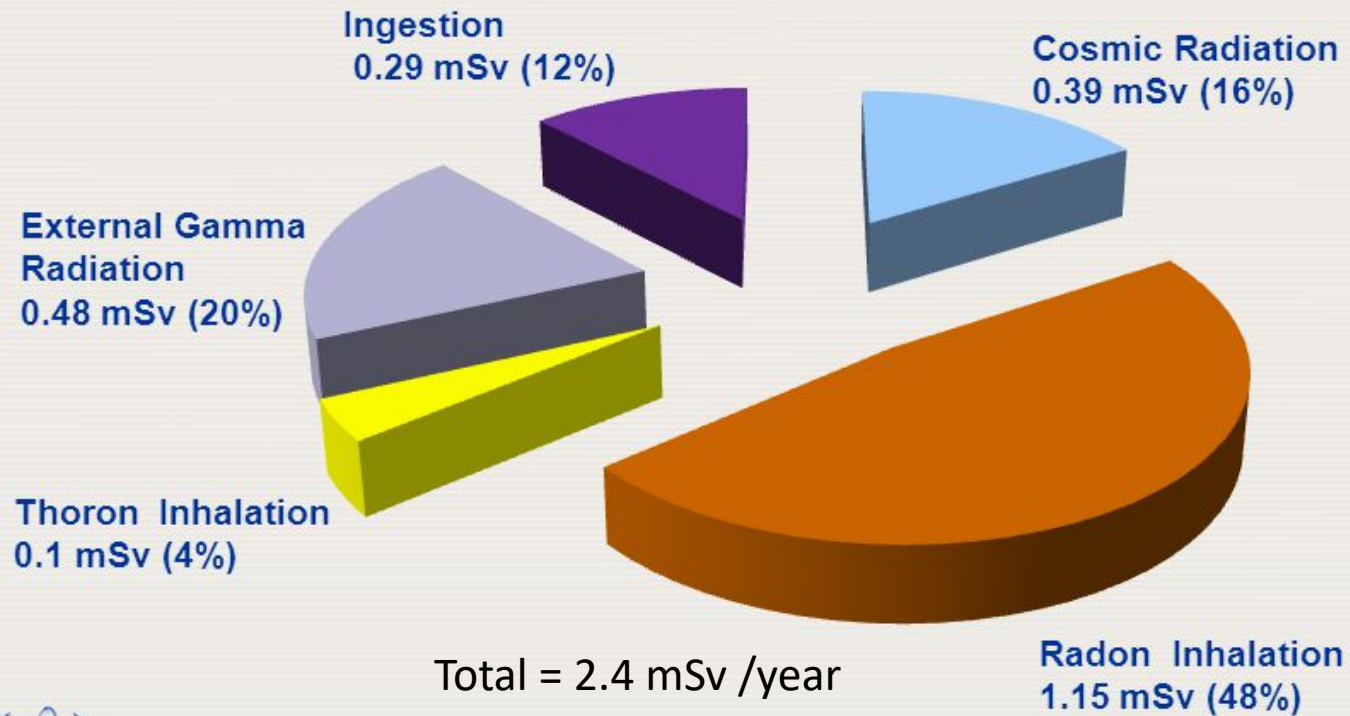
# Per Capita Annual Dose – UNSCEAR 2008

Total = 3 mSv/year



\* Others include Fallout, Nuclear Power Production, Occupational exposures etc.

# Per Capita Annual Doses from Natural Sources – UNSCEAR 2008





## WHO and Radon Health Effects

1988

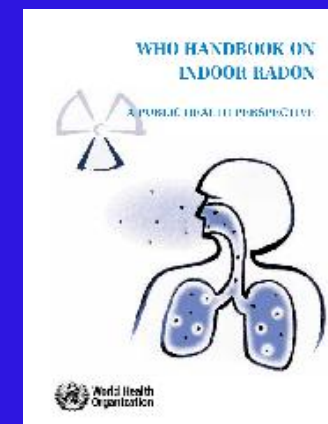


In 1988 the WHO specialised cancer research agency IARC (International Agency for Research on Cancer) classified radon as a Group 1 human carcinogen .

In 2009 the WHO International Radon Project estimated that globally “the proportion of lung cancers attributable to radon range from 3 % to 14 %”.

In 2011 WHO estimated that radon exposure is associated with more than 3000 deaths per year in the three countries of France, Germany and Switzerland

2009



2018



# ESTIMATES OF LUNG CANCER DEATHS ATTRIBUTABLE TO RADON

WHO Handbook on Indoor Radon (WHO 2009) : 3 % to 14 % globally.

Gaskin et al . Environmental Health Perspectives (May 2018) :

Ranged from 13.6% to 16.5 % for 66 countries

The 2012 estimate was > 200000 deaths or 3 % of all cancer deaths

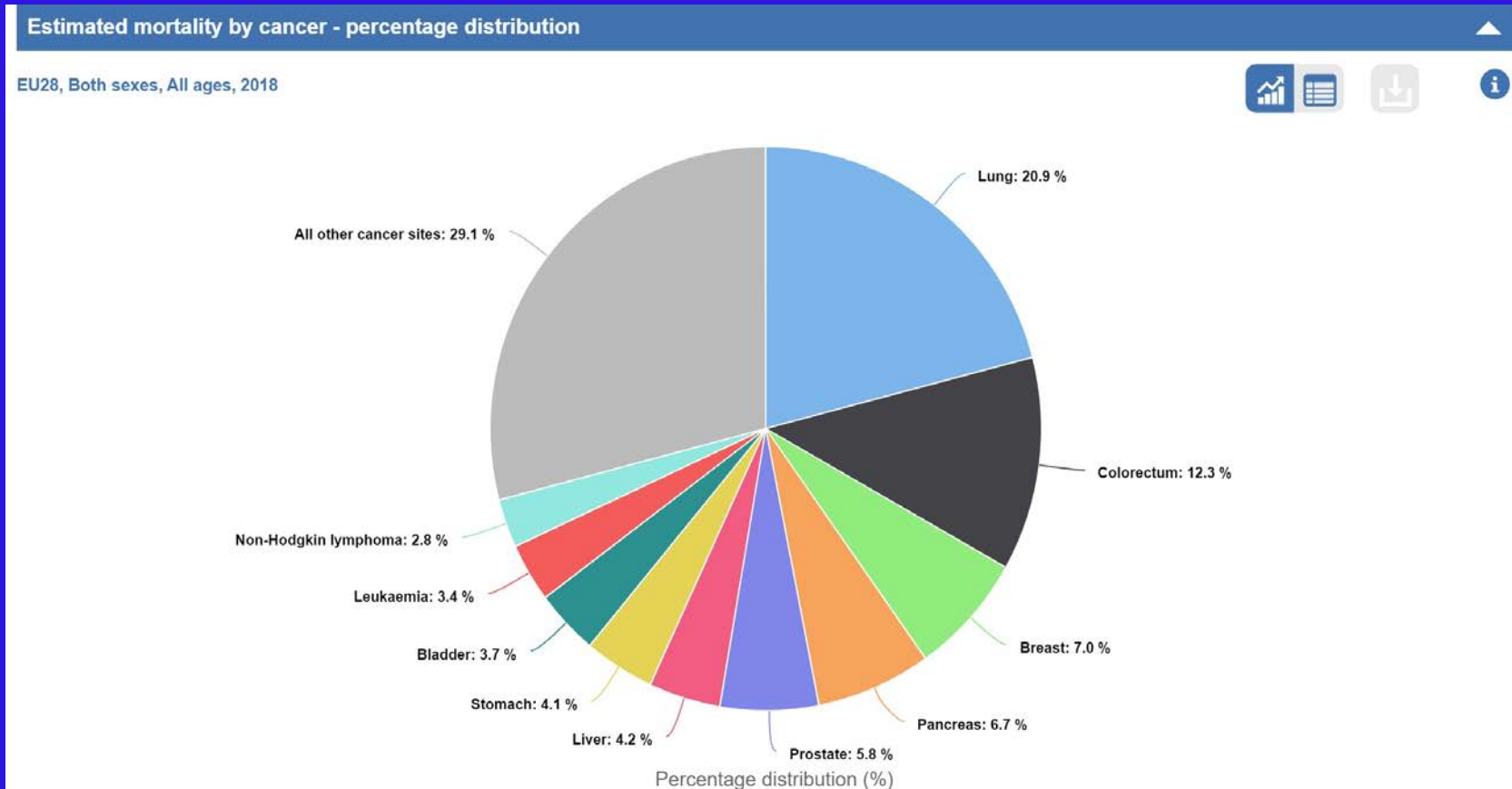
# EU 28 2018

Population = 513 Millions

Lung Cancer Incidence = 365000

Lung Cancer Deaths = 296000

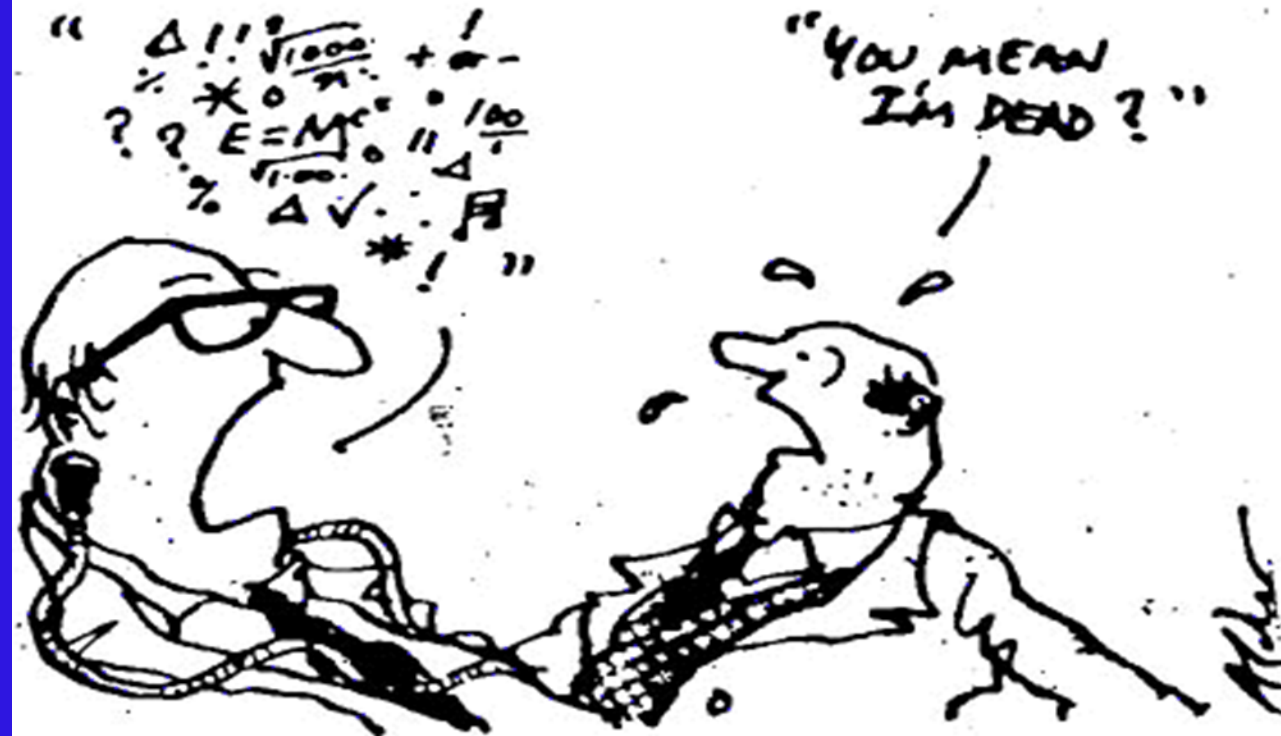
WHO 3% to 14 % Estimate ~ 9000 to 40000



Source : European Cancer Observatory , IARC 2019

RICOMET Conference Barcelona July 2019

COMMUNICATION BETWEEN  
SCIENTISTS AND THE PUBLIC



## SEVEN CARDINAL RULES FOR EFFECTIVE RISK COMMUNICATION (Corvello 2011)

1. People have the right to have a voice and participate in decisions that affect their lives.
2. Plan and tailor Risk Communication strategies to goals, audiences and channels.
3. Listen to your audience.
4. Be honest and transparent.
5. Coordinate and collaborate with credible sources of information and trusted voices.
6. Plan for media influence.
7. Speak clearly and with compassion.



# RADON RISK COMMUNICATION

Objectives :

Raise Awareness and Motivate to take Action

# TARGET AUDIENCES

Public

Decision Makers

Media

Employers and Employees

Medical and Educational Professionals

# A CRITIQUE OF SOME COMMON RADON RISK MESSAGES

RADON IS A NATURAL RADIOACTIVE GAS PRESENT IN MOST SOILS

RADON IS COLOURLESS, ODOURLESS AND TASTELESS

RADON CAN ENTER OUR HOMES FROM THE SOIL TO REACH UNACCEPTABLE LEVELS

Radon is natural  
but

indoor radon levels are not : they are anthropogenic.

Indoor radon levels and exposures are due  
to the ways we design, construct and use  
our homes and workplaces

# TECHNICALLY THE RADON "PROBLEM" CAN BE SOLVED

1. Radon is easy to measure.
2. There are reliable methods to reduce radon in most existing buildings.
3. It is possible to construct new buildings to have radon concentrations well below most national and international reference levels. EU Ref Level : 300 Bq/m<sup>3</sup>

# *Effective Radon Messages*

(Source : Krysti Miller , USEPA)

- **Radon is the 2nd Known Leading Cause of Lung Cancer**
- **Homes With Radon Problems Can Be Fixed**
- **Radon Testing is Simple and Inexpensive**
- **Test Your Home to Protect Your Family**

# MAIN BARRIERS TO DEALING WITH INDOOR RADON

APATHY

SOCIO-ECONOMIC FACTORS

## FROM RADON AWARENESS TO ACTION IN IRELAND \*

METRIC	LEVEL ACHIEVED
Awareness of Radon in General	75 %
Awareness of Radon and Lung Cancer	56%
Motivation to Measure Radon in Homes	1%
Motivation to Measure with Free Test Kit	22%
Motivation to Remediate Homes	25% of those > Ref.Level

\* Stephanie Long EPA Ireland “Radon Forum 2019”



Raising awareness of radon is easy.

Motivating target audiences to take action to  
measure or remediate is not.

# WHO Global Health Observatory Data Repository 2015

COUNTRY	PERCENTAGE OF DRIVERS WEARING SEAT BELTS	PERCENTAGE OF SMOKERS
JAPAN	99	33.7
SWEDEN	98	20.4
IRELAND	94	22.4
HUNGARY	87	32
POLAND	83	32.4
GREECE	77	52.6
SERBIA	70	43.6



EU Basic Safety Standards Annex XVIII .  
Radon Action Plan:  
Items to be considered include :

Strategy for communication to increase public awareness and inform local decision makers, employers and employees of the risks of radon, including in relation to smoking.

# ALTERNATIVE APPROACHES TO CURRENT RADON RISK COMMUNICATION STRATEGIES ARE NEEDED

INFORMATION CAMPAIGNS TARGETING THE PUBLIC WHICH JUST PROMOTE VOLUNTARY TESTING AND REMEDIATION ARE OF LITTLE HEALTH BENEFIT.

FROM A COST-BENEFIT PERSPECTIVE THEY ARE LIKELY TO GIVE VERY POOR VALUE FOR TAXPAYER'S MONEY.

THE COSTS MIGHT BE BETTER SPENT ON OTHER MORE IMPORTANT PUBLIC HEALTH PROBLEMS.

TARGETING DECISION MAKERS TO TAKE ACTION BY REGULATORY MEANS MAY BE MORE EFFECTIVE

# WHAT IS AN ACCEPTABLE RISK ?

The risk from a hazard might be considered acceptable when : \*

- it falls below some arbitrarily defined probability
- it falls below some level already tolerated
- the cost of reducing it would exceed the costs saved
- the opportunity cost would be better spent on other public health problems
- the general public say it is acceptable
- the radiation protection professionals say it is acceptable

\* Based on Hunter and Fewtrell (WHO 2001)

## AN ARBITRARY PRE-DEFINED PROBABILITY APPROACH

US EPA : Target reference **lifetime** risk range of  $10^{-3}$  to  $10^{-6}$  for carcinogens

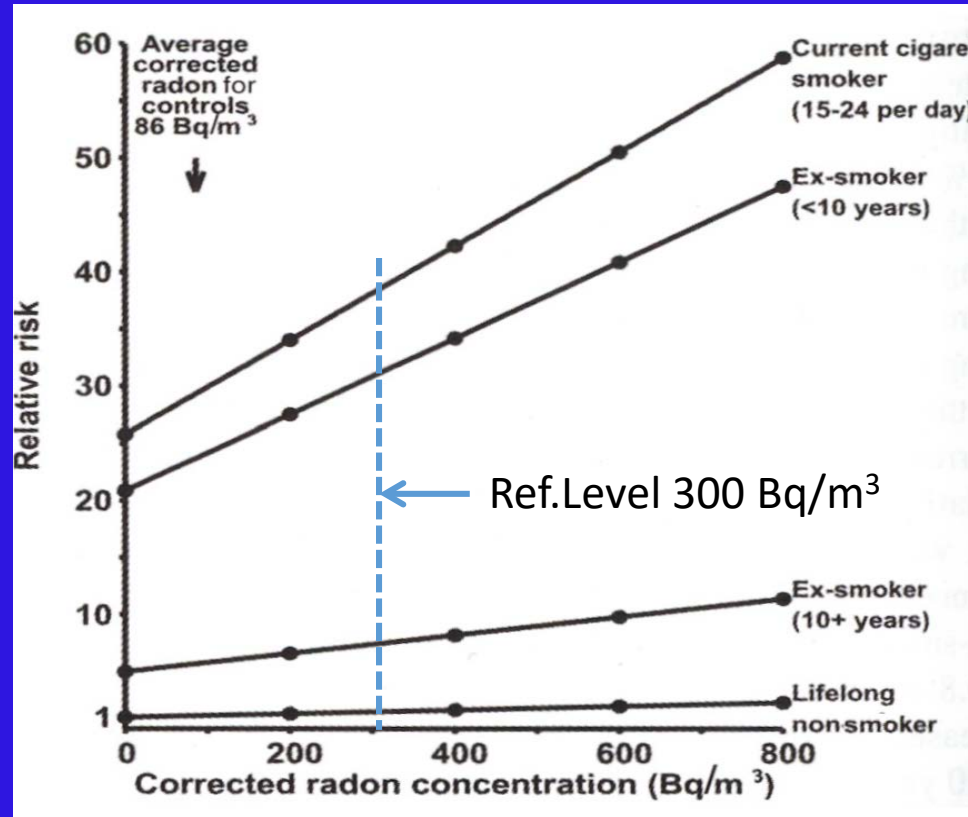
UK HSE : Categorised levels of **annual** risk of death as :

- 1 in 1000 as the “just tolerable risk “ for workers over a large part of working life.
- 1 in 10000 as “maximum tolerable risk “ for the public from a non-nuclear plant.
- 1 in 100000 as the “maximum tolerable risk “ for the public for any new nuclear power plant.
- 1 in 1000000 as the level of “acceptable risk” requiring no further safety improvements

**QUESTION :** Into which category would the lifetime risk from exposure at the EU radon reference level of  $300 \text{ Bq/m}^3$  fit ?

# Residential Radon Epidemiology

Pooling of 13 European residential case-control studies \*



7148 Cases

14208 Controls

PRINCIPAL FINDING : Excess Relative Risk (ERR) = 0.16 (95% CI 0.05-0.31 ) per 100 Bq/m<sup>3</sup> with no evidence of a threshold or that the ERR varied with age,sex or smoking history.

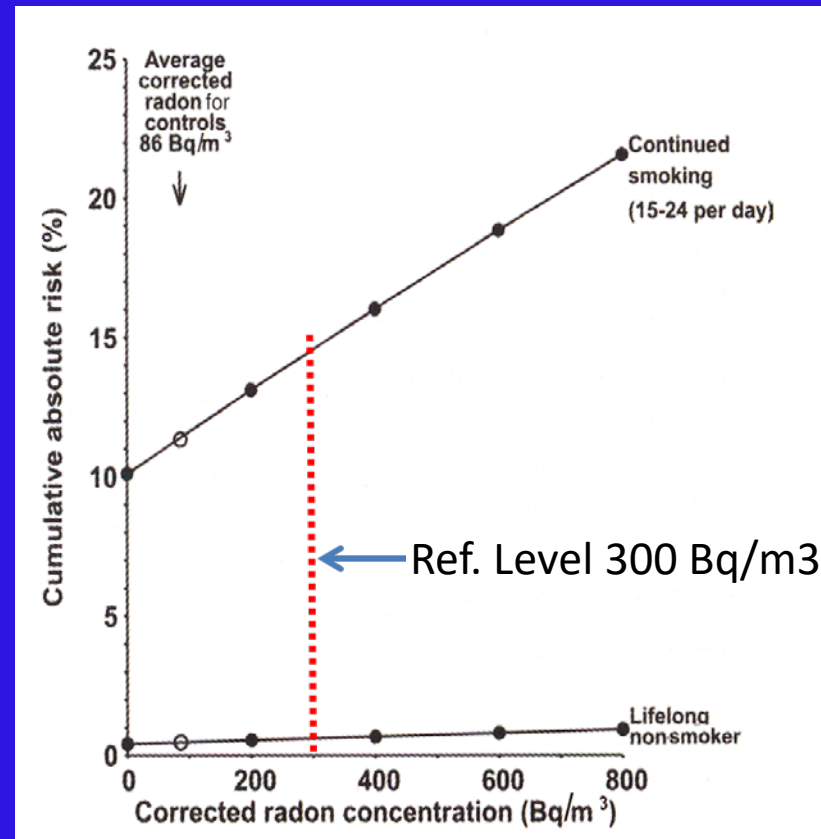
\* Darby et al .Br. Med.J. 330,223-228 (2005)

and

Darby et al Scand.J. of Work,Envir.& Health. Vol 32. Suppl 1. (2006)

# Cumulative absolute risk of death from lung cancer to age 75 years

Pooling of 13 European residential case-control studies\*



7148 Cases

14208 Controls

\* Darby et al Br. Med.J. 330,223-228 (2005) and  
Darby et al Scand.J. of Work,Envir.& Health. Vol 32. Suppl 1. 2006





[www.radoneurope.org](http://www.radoneurope.org)

Go raibh maith agat

Gràcies per la seva atenció

Gracias por su atención



# SUPPLEMENTARY SLIDES

If possible radon information campaigns should be linked to other health or environmental campaigns.

**Source : RADPAR Recommendations**

Dissemination of radon risk information should be endorsed by well known national and local health and environmental agencies.

**Source : RADPAR Recommendations**