

FACT SHEET

Pooling of European Residential Radon Studies

Title/Authors: “Radon in Homes and Risk of Lung Cancer: Collaborative Analysis of Individual Data from 13 European Case-control Studies”
S Darby, D Hill, A Auvinen, J M Barros-Dios, H Baysson, F Bochicchio, et al.

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Conclusion: Data provides direct evidence of a statistically significant association of residential radon exposure and lung cancer, as predicted by extrapolation from the miner studies.

Study Criteria: European case-control studies of residential radon and lung cancer that:

- registered over 150 people with lung cancer and 150 controls
- incorporated detailed smoking histories
- sought radon measurements in homes inhabited by these individuals during the past 15 years or more

Included Studies: Thirteen studies from nine European countries: Austria, Czech Republic, Finland [nationwide], Finland [south], France, Germany [eastern], Germany [western], Italy, Spain, Sweden [nationwide], Sweden [never smokers], Sweden [Stockholm], United Kingdom.

Subjects: 7,148 cases of lung cancer and 14,208 controls
Microscopic confirmation of lung cancer diagnosis was available for 6,310 cases

Design: Collaborative analysis of individual data. Data on each separate individual in the thirteen studies were collated centrally and analyzed with uniform methods.

Measurements: From residences occupied during the 5-34 years prior to diagnosis or acceptance as a control

Results:

- Proportionate increase in risk was not strongly influenced by any one study.
- Dose-response relationship appeared linear with no evidence of a threshold, and significant relation remained even among those whose measured radon concentrations were below 200 Bq/m³. Absolute risk to smokers and recent ex-smokers was much greater than to lifelong non-smokers.
- After stratification for study, age, sex, region of residence, and smoking the risk of lung cancer per 100 Bq/m³ increase in measured radon concentration increased by 8.4% [95% CI = 3.0%-15.8%, P = 0.0007]. After correction for random uncertainties in measurement of radon concentrations, the dose-response relation remained linear but nearly doubled in strength to 16% [95% CI = 5%-31%] per 100 Bq/m³ of estimated mean usual radon concentration.
- In Europe, radon in the home accounts for about 9% of deaths from lung cancer and 2% of all deaths from cancer.