

FACT SHEET

Pooling of North American Residential Radon Studies

Title/Authors: "Residential Radon and Risk of Lung Cancer: A Combined Analysis of 7 North American Case-control Studies"

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Citation: Epidemiology, 2005 March; 16 (2):137-45.

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

Study Criteria:

- North American case-control studies
- Cases obtained through State or Provincial registries and were histologically or cytologically confirmed
- Residential radon measurements based on long-term alpha track detectors placed in current and former homes of study subjects
- Data on modifying factors, including age, sex, and smoking

Included Studies: Seven studies from: New Jersey, Winnipeg, Missouri I (non-smoking women), Missouri II (women), Iowa, Connecticut, and Utah-South Idaho

Subjects: 3,662 cases of lung cancer and 4,966 controls
Histological type of lung cancer diagnosis was available for 3,496 cases

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

Measurements: From residences occupied within the 5-30 years prior to diagnosis or acceptance as a control. The proportion of time within this exposure window covered by radon measurements ranged from 75.2% in Winnipeg to 92.4% in Iowa.

Results:

- Excess odds ratio per 100 Bq/m³ of radon exposure varied from 0.01 (<0.00-0.42) in Missouri-I to 0.56 (-0.22-2.97) in New Jersey but did not demonstrate heterogeneity. [100 Bq/m³ = 2.7 pCi/L]
- No apparent evidence of non-linearity throughout the range of radon concentrations observed in these studies. Average radon concentration ranged from 26 Bq/m³ [0.7 pCi/L] in the New Jersey study to 127 Bq/m³ [3.4 pCi/L] in the Iowa study.

- Some evidence of decreasing radon-associated lung cancer risk with age.
- No substantial differences in the excess odds ratio by categories of cigarette smoking, number smoked/day, duration of smoking, or time since quitting.
- Overall, the odds ratios for lung cancer increased with increasing radon exposure categories, with an odds ratio of 1.37 (0.98-1.92) for concentrations exceeding 200 Bq/m³ [5.4 pCi/L] relative to concentrations under 25 Bq/m³ [.68 pCi/L]. The overall estimate of the excess odds ratio for lung cancer per 100 Bq/m³ [2.7 pCi/L] was 11% (0%-28%).
- **Case restrictions that increased radon measurement coverage of the exposure time window [5-30 years prior to diagnosis] resulted in increasing excess odds ratios.**