

RISK FROM OCCUPATIONAL AND ENVIRONMENTAL RADON AND ROLE OF SMOKING

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Background and Aims: Because of the predominant role of cigarette smoking as a cause of lung cancer, an understanding of the joint effect of smoking and radon exposure is needed for the appropriate assessment of the risk from radon.

Methods: The present study is based on two Czech cohorts of U miners (N=10 900) and on another cohort of people exposed to high levels of radon in houses (N=11 900). Results are based on recent data by 2010 which include 1107 and 240 cases of lung cancer in the occupational and residential studies, respectively. Individual smoking data were collected for most of subjects (68% and 75%, respectively). The relative risk is evaluated in dependence on cumulated exposure with effect modification by time since exposure and smoking.

Results: It is shown that the excess relative risk per unit exposure from earlier periods of exposure (20 years and more) is about 1/3 in comparison to recent exposures (5-19 years), whereas the relative effect from exposures before 35 years is only about 1/10. Smoking specific estimates of excess relative risk per unit exposure were 3-5 times higher among never smokers in both studies. In addition, the interaction of radon and smoking is evaluated by geometric mixture models and is found to be between additive and multiplicative model. When smoking specific equivalent doses to the lungs and modifying effect of time since exposure are used, the combined effect of radon and smoking is close to the additive model.

Conclusions: The study confirms the additive role of smoking and radon, particularly when temporal factors and smoking specific estimates of radiation doses are used in the model. The work was conducted under project NS 10596 of the Czech Ministry of Health.