

## Lung Cancer Risk from Radon Inhalation during the Summer of 2013 in Rize Province

Songul Akbulut

Recep Tayyip Erdogan University, Department of Physics, TR-53100, Rize, Turkey  
songul.akbulut@erdogan.edu.tr

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**Extended Abstract** The objective of the study is to determine the risk of lung cancer associated with exposure to the radioactive disintegration products of naturally occurring radon gas at homes. <sup>222</sup>Radon arises naturally from the decay of <sup>238</sup>U, which is present throughout the earth's crust which has a half life of 3, 82 days, and diffuses through soil and into the air before it decays by emission of an  $\alpha$  particle into a series of short lived radioactive progeny.

Concentrations are low outdoors but can build up indoors, especially in homes, where the most exposure occurs. Radon exposure increased risk of lung cancer approximately 10 -20 % (Celik et al., 2008). Many governments and international bodies have therefore recommended that radon exposures in houses should be limited.

A population-based case-control study was conducted in a large number of dwellings of the Rize province in the north part of Turkey. A total of 85 cases (home of lung cancer patients) in indoor and 31 cases in outdoor took part in the study. The CR-39 solid-state nuclear track detectors were kept for a period of 4 months from July of 2013 to November of 2013 in order to be exposed to radon gas.

The results of indoor and outdoor radon measurements ranged from 9 to 503 and 7 to 111 Bq/m<sup>3</sup> and average radon concentrations were found to be 34 and 23 Bq/m<sup>3</sup> for indoor and outdoor, respectively. According to the results, high values were observed only at some points. For this reason, quite low average values are observed for the Rize province. The highest value of 503 and 111 Bq/m<sup>3</sup> are higher than the mean value of 40 Bq m<sup>-3</sup> (UNSCEAR, 2000a), reported for the dwellings worldwide, but less than the lower limit of action level range of (200–600) Bq/m<sup>3</sup>, recommended by the ICRP (1990).

The annual effective dose was estimated to be approximately 0,85 and 0,57 mSv for indoor and outdoor radon exposure, respectively. Considering the worldwide annual effective dose value of 1.2 mSv due to radon exposure (UNSCEAR, 2000a,b,c), it can be noted that the present result is quite lower than this figure.

It was estimated from the measurements that the indoor and outdoor radon exposure is responsible for 5.5 % of lung cancer deaths occurred in the area.

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