

# Valutazione delle concentrazioni di radon nel settore bancario: risultati di una indagine condotta in un gruppo bancario di rilevanza nazionale

PATRIZIA URSO, M. RONCHIN, BARBARA LIETTI\*, A. IZZO\*\*, G. COLLOCA\*\*, D. RUSSIGNAGA\*\*, P. CARRER

Dipartimento di Medicina del Lavoro, Ospedale "L. Sacco", Università degli Studi di Milano

\* Centro Internazionale per gli Antiparassitari e la Prevenzione Sanitaria, Azienda Ospedaliera "L. Sacco", Milano

\*\* Gruppo Intesa Sanpaolo, Servizio di Prevenzione e Protezione - Italia

## KEY WORDS

Radon; bank buildings; explanatory factors

## SUMMARY

**«Evaluation of radon levels in bank buildings: results of a survey on a major Italian banking group».** **Background:** Radon, the second cause of lung cancer after smoking, is a natural, radioactive gas, which originates from the soil and pollutes indoor air, especially in closed or underground spaces. Italian legislation recommends an action level of 500 Bq/m<sup>3</sup> per year for occupational exposure in underground premises. **Objectives:** Since banks usually use various underground premises (archives, safe-deposit room), a study was made of the radon levels on such premises with the aim of identifying useful monitoring strategies. **Methods:** 134 branches of a major Italian banking group were examined using 1817 nuclear track dosimeters at ground level and underground level premises. The branches were located in 7 Italian regions in the north (Piedmont, Lombardy, Veneto), centre (Lazio) and south (Campania, Apulia, Sicily). Information on measurement points was recorded in a technical sheet and statistical analysis was carried out. **Results:** Annual underground measurements gave an average concentration of 157 Bq/m<sup>3</sup>, with 5,1% for 400 < C < 500 Bq/m<sup>3</sup> and 2,9% for C > 500 Bq/m<sup>3</sup>. Seasonal variability was reflected in a significant decrease in concentrations between winter and spring ( $\Delta_{\text{mean}}\% = -47,3\%$ ) and good stability between autumn and winter ( $\Delta_{\text{mean}}\% = 3\%$ ); moreover quarterly concentrations account for 85% of the variability of the corresponding annual level. A multiple linear regression model ( $R^2 = 0,33$ ) indicated geographic location as the principal factor in radon accumulation, followed by underground level, humidity, use, lack of windows, heating and natural ventilation, and direct contact of at least one wall with ground rock; whereas the safe-deposit room structure seems to protect from radon accumulation. Moreover, the ground level measurement results were significantly associated with the corresponding underground average concentrations ( $p < 0,001$ ). **Conclusions:** The results could be a useful tool in planning a monitoring strategy for assessment of bank worker exposure, especially for banking groups with a large number of branches.