

Lung cancer risk and residence in the neighborhood of a sewage plant in Italy. A case-control study

Anna Maria Pizzo, Elisabetta Chellini, and Adele Seniori Costantini

Environmental and Occupational Epidemiology Unit, ISPO Cancer Prevention and Research Institute, Florence, Italy

ABSTRACT

Aims and background. Environmental pollution originating in sewage and industrial plants can be associated with lung cancer risk, as ecological and case-control studies have indicated. In the present study, the association between lung cancer occurrence and residence near a sewage plant in Prato (Italy) was investigated. A previous geographic study in the same area had shown an increasing trend of lung cancer mortality and incidence with propinquity to the plant.

Methods. A case-control study was carried out in the male population of Prato. Incident cases in the period 1987-1997 were identified from the Tuscan Cancer Registry (no. 918). Controls were randomly extracted from the Registry Office of the Municipality of Prato (no. 1852). For all subjects, the residential history was reconstructed. A weighted average distance from the plant was computed and used as a proxy variable of exposure. Two analyses were performed: on the whole data set and on a subset of subjects for whom information on tobacco exposure and education was obtained through a postal questionnaire (response rate, 41.1%). Logistic regression models were applied to estimate odds ratios and 95% CI.

Results. Both analyses showed a significantly elevated lung cancer risk for subjects living within 1.5 km ($OR_{\text{whole}} = 1.56, 1.06-2.28$; $OR_{\text{subset}} = 2.28, 1.06-4.86$) and suggested a risk increase with a decrease of weighted average distance from the plant.

Conclusions. The findings highlight a possible role, in lung cancer occurrence, for environmental pollution spread from the plant. Due to drawbacks of the study, further analyses are needed to evidence a noncontroversial etiological conclusion. When environmental data are not available, results of epidemiological studies using residential histories may be useful in preventive policies regarding point source emissions. Free full text available at www.tumorionline.it

Key words: case-control study, environmental pollution, lung cancer, sewage plant.

Acknowledgments: We thank the Statistical Office and the Registry Office of the Municipality of Prato for providing demographic data. We give special thanks to Dr Andrea Mangano of the Statistical Office of the Municipality of Prato for his help in using the registry files, to Dr Alessandra Petrucci of the Department of Statistics of the University of Florence who provided the geographical coordinates of the census units, to Dr Sergio Spagnesi of the Environmental Office of the Municipality of Prato for his invaluable help, and to Dr Francesco Cipriani for his critical comments and suggestions. All the responders to the mail questionnaire are also gratefully acknowledged. Financial support for the study was provided by the Municipality of Prato, the Local Health Administration of Prato and GIDA SpA.

Correspondence to: Anna Maria Pizzo, Environmental and Occupational Epidemiology Unit, ISPO Cancer Prevention and Research Institute, via di S. Salvi 12, 50135 Florence, Italy. Tel +39-055-6268-362/345; fax +39-055-679954; e-mail m.pizzo@ispo.toscana.it

Received June 9, 2010; accepted October 29, 2010.