

29<sup>TH</sup> ANNUAL MEETING  
OF THE INTERNATIONAL ASSOCIATION  
OF CANCER REGISTRIES

17–20 September 2007, Ljubljana, Slovenia

PROGRAMME AND  
BOOK OF ABSTRACTS



At the Crossroad of Tradition and new  
Technologies in Cancer Registration

The Role of Cancer Registries  
in Cancer Control

OP17

## CANCER PATTERN ASSOCIATED TO GROUND CONCENTRATION OF ARSENIC IN NAPLES PROVINCE, ITALY, 1999–2002

Bidoli E<sup>1</sup>, Montella M<sup>2</sup>, De Vivo B<sup>3</sup>, Lima A<sup>3</sup>, Albanese S<sup>3</sup>, De Luca M<sup>3</sup>,  
Pappagallo M<sup>4</sup>, Bruzzone S<sup>4</sup>

<sup>1</sup>Epidemiology and Biostatistics Unit, Oncological Center, Aviano, Italy

<sup>2</sup>Epidemiology Unit, Istituto Tumori Fondazione Pascale, Naples, Italy

<sup>3</sup>Dipartimento di Geofisica e Vulcanologia, University of Naples, Italy

<sup>4</sup>Italian Institute of Statistics, Rome, Italy

**Aim.** In the province of Naples, South-Italy, excesses of cancer mortality and incidence are located in specific areas distributed heterogeneously. The aim of the present study was to explore at municipality level the association between mortality from selected cancers and the arsenic (As) concentration in ground.

**Materials and Methods.** Number of events disentangled by age, gender, residence, and disease (cancers of the lung, kidney, and bladder) and corresponding resident population were obtained from Italian National Institute of Statistics. The ground concentration of As was derived from the geochemical Atlas of grounds of the province of Naples. Spatial variation was examined across the smallest available administrative areas (91 municipalities, excluding the city of Naples). Based on small number of events at municipality level, a fully Bayesian modelling approach and a Markov Chain Monte Carlo method were used to stabilize and compute Relative Risks (RR) estimates.

**Results.** Median concentration of As was 12 mg/kg (range 5–36). Three municipalities displayed values higher than 20 mg/kg, which is the 2006 Italian safety threshold. A statistically significant association was observed between As concentration and cancers of the lung (RR = 1.10; 95% CI: 1.04–1.16) and kidney (RR = 1.39; 95% CI: 1.07–1.81). An association with bladder cancer (RR = 1.08; 95% CI: 0.95–1.23) was also observed.

**Conclusions.** In the province of Naples the ground concentration of As is significantly associated with cancers of lung and kidney. As was one of the first chemicals to be recognized as a cause of specific cancers, and its margin of safety intake lowered in the last century. The volcanic nature of the ground mainly explains the concentration of As, however, human activities such as industrial or agricultural settings (steel or herbicides plants) or consumption of contaminated foods (for instance, shellfish or fish) cannot be excluded as risk factors. From a public health point of view it would be essential to define with greater precision the nature and the characteristics of sources and intakes of As in order to assess its role as an environmental indicator of cancer risk. Uncertainties of our study include lack of information on tobacco smoking whose avoidance will reduce alone the incidence of the examined cancers and the sensitivity limitations associated with the ecological nature of our study. Future works including more years of observation and a cross-validation with incidence data will increase precision and weight to the RR estimates.

**Key words:** Geographical pattern; Lung cancer; Kidney cancer; Arsenic; Naples Italy