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Schedule of Events
Scientific Program
Abstracts by Session

Presentation title:
Inorganic selenium exposure in drinking water and cancer incidence: a natural experiment

Presenting Author:
Marco Vinceti
Presenting Author e-mail:
marco.vinceti@unimore.it
All authors and affiliations:
Marco Vinceti (1)(2); Carlotta Malagoli (1); Marcella Malavolti (1), Tommaso Filippini (1); Silvia Cilloni (1); Lauren Wise (2); Claudio Sacchettini (3); Massimo Vicentini (3); Paola Ballotari (3); Paolo Giorgi Rossi (3)
1. Research Center for Environmental, Genetic and Nutritional Epidemiology - University of Modena and Reggio Emilia, Modena, Italy
2. Department of Epidemiology - Boston University School of Public Health Boston, MA, United States
3. Interinstitutional Epidemiology Unit of Local Health Authority and IRCCS Arcispedale S.Maria Nuova, Reggio Emilia, Italy
Presenting author profile:
Dr. Marco Vinceti is Associate Professor of Epidemiology and Public Health at the Department of Biomedical, Metabolic and Neural Sciences - Section of Public Health, University of Modena and Reggio Emilia Medical School and adjunct Associate Professor, at the Department of Epidemiology, Boston University School of Public Health, Boston

Background: Selenium (Se) is a metalloid of nutritional and toxicological importance in humans. To date, limited epidemiologic evidence exists about the health effects of exposure to this trace element through drinking water. We investigated the relation between Se levels in tapwater and cancer incidence in the municipality of Reggio Emilia, Italy, where a subset of the population consumed unusually high levels of inorganic Se through drinking water.

Methods/Approach: During 1980-1985, 5182 residents consumed drinking water with Se levels close to the European standard of 10 μg/L in its inorganic hexavalent form (selenate). Follow-up was conducted during 1986-2013 in Reggio Emilia for the exposed cohort and for a comparison, unexposed cohort. The unexposed cohort included 100,000 municipal residents, having socio-demographic characteristics comparable with those of the exposed cohort. We used a Poisson regression model to estimate rate ratios (RR) for the association between exposure and cancer incidence from 1986 through 2013, adjusting for age and sex.

Results: We observed little difference in overall cancer incidence comparing exposed with unexposed cohorts. We observed a higher incidence of neoplasms of buccal cavity and pharynx, colon-rectum, Hodgkin's lymphoma, melanoma and non-melanoma-skin cancer among the exposed, with a monotonic trend of decreasing incidence over time detected for the neoplasms of the buccal cavity and pharynx, and for non-melanoma skin cancer. An increased risk of the latter cancer subtype had been previously observed in a randomized controlled trial.

Conclusions: Although there was little difference in overall cancer incidence among individuals with long-term, high-level exposure to inorganic selenium through drinking water, the exposed had a higher incidence of selected site-specific neoplasms.