

**TITLE:** Long-term exposure to polycyclic aromatic hydrocarbons (PAH), mortality and incidence of lung cancer in the Rome Longitudinal Study, 2008-2012 - the EXPAH (Population Exposure to PAHs) project

**Authors:** Giulia Cesaroni (1), Francesco Forastiere (1), Chiara Badaloni (1), Angelo Cecinato (2), Sandro Finardi (3), Maria Pia Gatto (4), Monica Gherardi (4), Cinzia Perrino (2), Paola Romagnoli (2), Camillo Silibello (3), Massimo Stafoggia (1), Claudio Gariazzo (4), EXPAH Study Group.

(1) Department of Epidemiology, Lazio Region Health Service, Rome, Italy

(2) CNR-IIA, Montelibretti, Rome, Italy

(3) ARIANET, Milan, Italy

(4) INAIL Research center, Monteporzio Catone, Rome, Italy

**Primary category:** ambient air pollution

**Secondary category:**

**Abstract** (max 1500 characters, including spaces, and 1 table)

### **Background**

The evidence on the association between long-term exposure to particles with mortality, above all cardiovascular mortality, is well established. Some studies have shown an association with lung cancer incidence. The association between chronic exposure to polycyclic aromatic hydrocarbons and health outcomes is less clear. The objective of the EXPAH project was to estimate population exposure to PM<sub>2.5</sub> and PAH, and to investigate their long-term association with mortality and morbidity in Rome, Italy.

### **Methods**

We used the Rome Longitudinal Study, a census based cohort of the residents in Rome. We selected subjects aged 40 years, who were living in Rome on the 1<sup>st</sup> Jan 2008, and we followed them till 31<sup>st</sup> Dec 2012. Residential exposure to PAHs and PM<sub>2.5</sub> was assigned by means of a chemical transport model (1km spatial resolution), using measurements collected during EXPAH field campaigns, and provided by Rome air quality network, for model validation and improvement.

We used Cox regression models to evaluate the association between pollutants and non-accidental mortality, cardiovascular mortality, and lung cancer incidence, adjusting for several individual and contextual factors.

### **Results**

During the follow-up, among the 1,013,886 subjects, there were 80,941 deaths for non-accidental causes and 7,585 incident cases of lung cancer. Table 1 shows the association between pollutants and health outcomes.

### Conclusions

We found evidence of an association of all the exposures with non-accidental and cardiovascular mortality, and incidence of lung cancer.

**Table 1. Association between air pollution exposure, mortality, and incidence of lung cancer. Rome 2008-2012**

	<b>Non-accidental Mortality (80,941 deaths)</b>			<b>Cardiovascular Mortality (32,460 deaths)</b>			<b>Incidence of lung cancer (7,585 cases)</b>		
	<b>HR</b>	<b>95%CI</b>		<b>HR</b>	<b>95%CI</b>		<b>HR</b>	<b>95%CI</b>	
1 ng/m <sup>3</sup> PAH	1.04	1.02	1.06	1.04	1.01	1.08	1.08	1.01	1.14
0.25 ng/m <sup>3</sup> BaP	1.04	1.02	1.06	1.05	1.01	1.08	1.08	1.01	1.14
10 ug/m <sup>3</sup> PM <sub>2.5</sub>	1.08	1.03	1.14	1.15	1.07	1.25	1.22	1.04	1.43

HR: adjusted for occupation, education, marital status, area-based socioeconomic position, income, diabetes, hypertension, stratified by sex, with age as time-scale