



MAPEC_LIFE - Monitoring air pollution effects on children for supporting Public Health Policy

LIFE12 ENV/IT/000614

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Project description:

Background

Several epidemiological studies have demonstrated the association between exposure to air pollution and mortality and morbidity in humans. In 2005, an estimated 5 million years of life were lost due to fine particle pollution in 32 European countries (European Environment Agency Technical report no. 12/2011, Air quality in Europe). Urban pollution, caused by traffic, factories, heating systems and energy generation, is a complex and variable mixture of several compounds, some of which cause genetic damage.

Recent epidemiological studies have found an association between exposure to airborne particulate matter (PM) – consisting of breathable particles to which heavy metals, polycyclic aromatic hydrocarbons (PAHs) and volatile compounds can adhere – and the incidence of, and mortality caused by, cardiovascular disease, lung cancer and possibly other chronic diseases such as diabetes and chronic obstructive pulmonary disease. Children are at a higher risk from airborne chemicals, because they have higher levels of physical activity (and spend more time outside) than adults, a smaller body size, faster growth rates and relatively immature organs, body functions, immune systems and cell repair mechanisms. Finally, recent data suggests that genetic damage occurring early in life can increase the risk of carcinogenesis in adulthood.

Objectives

MAPEC_LIFE will evaluate the links between pollutants such as PM and nitrogen oxides, and PAHs and nitroPAHs (nitro-polycyclic aromatic hydrocarbons), and their early effects. The project will then build a model for estimating the risk to children from air pollutants and other factors.

The specific objectives are:

- To assess the concentrations of certain organic compounds (PAHs and nitroPAHs) in the air in some Italian towns;
- To assess air mutagenicity and toxicity in the same areas, through in-vitro tests on very fine particles (PM0.5);
- To study the relationship between the concentration of air pollutants and air mutagenicity and toxicity;
- To investigate children's exposure to other indoor and outdoor airborne pollutants, via a questionnaire filled in by the children's parents;
- To assess early effect biomarkers in oral mucosa cells from the children;
- To carry out a risk analysis of carcinogenic effects based on environmental data;
- To compare the results of the risk-analysis model ("expected") with the early effect biomarkers actually found in the children ("observed").

Expected results:

- Completed questionnaires for 1000 children aged 6-8 years;
- Collection of 20-45 PM0.5 air samples, and analysis of PAHs, nitroPAHs and in-vitro mutagenicity/toxicity tests on the samples;
- Collection of 1000 samples of children's oral mucosa cells in both summer and winter seasons, and evaluation of early effect biomarkers in the samples;
- Preparation of risk analysis models based on environmental data;
- An assessment of the relationship between air pollutants, air mutagenicity/toxicity, and early effect biomarkers, and an evaluation of the value of the risk analysis model for predicting early biological effects in children;
- Construction of a global model of the risk of early biological effects in children;
- Recommendations for measures and policies to protect children from the health effects of air pollutants.

Results

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Environmental issues addressed:

Themes

Risk management - Risk assessment and monitoring
Risk management - Human health protection

Keywords

monitoring, decision making support, monitoring system, air pollution, risk assessment, public health, human exposure to pollutants

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator	University of Brescia
Type of organisation	University
Description	The beneficiary is a department of the University of Brescia, which specialises in the study of environmental health risks, including the evaluation of genotoxic risks, the development of cancer and cardiovascular diseases, respiratory symptoms and diseases; and allergies in adults and children.
Partners	Comune di Brescia, Italy CSMT Gestione s.c.a.r.l., Italy University of Perugia, Italy University of Pisa-Department of Biology, Italy University of Salento-Department of Biological and Environmental Sciences and Technologies, Italy University of Torino, Italy

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Administrative data:

Project reference	LIFE12 ENV/IT/000614
Duration	01-JAN-2014 to 31-DEC -2016
Total budget	2,246,502.00 €
EU contribution	1,112,189.00 €
Project location	Lombardia(Italia)

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