IL PROGETTO MAPEC

Lo studio MAPEC LIFE (Monitoring Air Pollution Effects on Children) è stato approvato quest'anno dalla Commissione Europea e finanziato dal programma LIFE+, il fondo per l'ambiente dell'Unione europea (http://ec.europa.eu/life). Il progetto è coordinato dall'Università degli Studi di Brescia (responsabile Prof. U. Gelatti). Partecipano al progetto le Università di Perugia (responsabile Prof. S. Monarca), Pisa (responsabile Prof. A. Carducci), Lecce (responsabile Prof. M. A. De Donno) e Torino (Prof. E. Carraro), il Comune di Brescia e il Centro Servizi Multisettoriale e Tecnologico (CSMT Gestione s.c.a.r.l) di Brescia. Il progetto avrà inizio a gennaio 2014 ed è di durata triennale, per cui si concluderà a dicembre 2016.

La ricerca ha l'obiettivo principale di valutare l'associazione tra la concentrazione di alcuni inquinanti atmosferici, quali PM 0,5, NOx, IPA, nitroIPA e altri, ed alcuni marcatori di effetto biologico precoce, quali il danno al DNA, valutato mediante Comet test, e la presenza di micronuclei, nelle cellule della mucosa orale dei bambini di 6-8 anni di età. A tal fine verranno reclutati 1000 bambini in 5 centri italiani, a diversi livelli di inquinanti aerei, nella stagione invernale ed estiva. Verranno inoltre raccolti i dati concernenti altre esposizioni indoor e outdoor e lo stile di vita dei bambini, in particolare le abitudini alimentari, mediante un questionario compilato dai genitori, per valutare la possibile azione di altri fattori di rischio e protettivi nel modificare l'effetto degli inquinati aerei.

Lo studio prevede inoltre la diffusione dei risultati alla popolazione e presso le autorità locali in modo da orientare interventi e policy intese a proteggere la salute dei bambini dai possibili danni degli inquinanti atmosferici.

Monitoring air pollution effects on children for supporting Public Health Policy

Project 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) 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. They also have smaller bodies, 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.

Project objectives

MAPEC_LIFE will evaluate the links between pollutants, such as PM and nitrogen oxides, and polycyclic aromatic hydrocarbons (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;
- Assess air mutagenicity and toxicity in the same areas, through in-vitro tests on very fine particles (PM0.5);
- Study the relationship between the concentration of air pollutants and air mutagenicity and toxicity;
- Investigate children's exposure to other airborne pollutants, via a questionnaire filled in by parents;
- Assess early effect biomarkers in oral mucosa cells from the children;
- Carry out a risk analysis of carcinogenic effects based on environmental data; and
- Compare the results of the risk-analysis model ('expected') with the early effect biomarkers actually found in the children ('observed').

LIFE12 ENV/IT/000614
MAPEC_LIFE

Beneficiary:

Type of beneficiary
University

Name of beneficiary
University of Brescia

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Name of contact person
Umberto GELATTI

Duration of project:
36 months (01/01/2014 – 31/12/2016)

Total budget in euro:
2,328,832.00

EC contribution in euro with %:
1,153,354.00 (50.00%)

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

Expected results

- Completed questionnaires for 1000 children aged 6-8;
- 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; and
- Recommendations for measures and policies to protect children from the health effects of air pollutants.