

Monitoring Air Pollution Effects on Children for Supporting Public Health Policy: Preliminary Results of MAPEC_LIFE Project

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Abstract : Introduction: Air pollution is a global problem. In 2013, the International Agency for Research on Cancer (IARC) classified air pollution and particulate matter as carcinogenic to human. The study of the health effects of air pollution in children is very important because they are a high-risk group in terms of the health effects of air pollution and early exposure during childhood can increase the risk of developing chronic diseases in adulthood. The MAPEC_LIFE (Monitoring Air Pollution Effects on Children for supporting public health policy) is a project founded by EU Life+ Programme which intends to evaluate the associations between air pollution and early biological effects in children and to propose a model for estimating the global risk of early biological effects due to air pollutants and other factors in children. Methods: The study was carried out on 6-8-year-old children living in five Italian towns in two different seasons. Two biomarkers of early biological effects, primary DNA damage detected with the comet assay and frequency of micronuclei, were investigated in buccal cells of children. Details of children diseases, socio-economic status, exposures to other pollutants and life-style were collected using a questionnaire administered to children's parents. Child exposure to urban air pollution was assessed by analysing PM0.5 samples collected in the school areas for PAHs and nitro-PAHs concentration, lung toxicity and in vitro genotoxicity on bacterial and human cells. Data on the chemical features of the urban air during the study period were obtained from the Regional Agency for Environmental Protection. The project created also the opportunity to approach the issue of air pollution with the children, trying to raise their awareness on air quality, its health effects and some healthy behaviors by means of an educational intervention in the schools. Results: 1315 children were recruited for the study and participate in the first sampling campaign in the five towns. The second campaign, on the same children, is still ongoing. The preliminary results of the tests on buccal mucosa cells of children will be presented during the conference as well as the preliminary data about the chemical composition and the toxicity and genotoxicity features of PM0.5 samples. The educational package was tested on 250 children of the primary school and showed to be very useful, improving children knowledge about air pollution and its effects and stimulating their interest. Conclusions: The associations between levels of air pollutants, air mutagenicity and biomarkers of early effects will be investigated. A tentative model to calculate the global absolute risk of having early biological effects for air pollution and other variables together will be proposed and may be useful to support policy-making and community interventions to protect children from possible health effects of air pollutants.

Keywords : air pollution exposure, biomarkers of early effects, children, public health policy

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