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## Navigation

- ▶ [Home](#)
- ▶ [FAQ](#)
- ▶ [Register](#)
- ▶ [Login](#)

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## Abstract View

### Child Exposure to Indoor and Outdoor PM at Schools and Homes in the Lisbon Metropolitan Area, Portugal

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#### Abstract

Numerous personal exposure studies have revealed poor correlations between outdoor ambient PM concentrations and personal exposure measurements. In fact, the personal exposure includes not only contributions from ambient PM sources, but also contributions from indoor, commuting and leisure activities, which depend on the lifestyle of each individual and the different microenvironments frequented, such as home, workplace, commuting type, etc. Since people spend most of their time (80 – 90%) indoors, it is widely recognized that a significant portion of total personal exposure to ambient PM occurs in indoor environments. Whilst the health effects of adult exposure cannot be neglected, children are more susceptible than young adults to air pollutants; therefore, their exposure is a major health concern.

This study aims to assess the indoor and outdoor PM concentrations at several schools and homes in the Lisbon metropolitan area (Portugal) to calculate the children exposure. In the scope of the European Project LIFE Index-Air, PM<sub>2.5</sub> and PM<sub>2.5-10</sub> samples were collected in parallel in the indoor and outdoor of 40 homes and 5 schools. Sampling was carried out during the occupied time: 8h at schools and 15h at homes. Once the gravimetric determination of the PM mass concentrations was performed, the chemical characterization of the PM collected on the filters was carried out. The elemental analysis of PM samples was performed with a high-resolution energy dispersive X-Ray fluorescence spectrometer; the elemental carbon and organic carbon fractions of PM was analyzed by a thermal-optical method, and Polyaromatic Hydrocarbons were analyzed by gas chromatography-mass spectrometry. After the chemical composition of PM the exposure of children to PM components was assessed.

In the absence of indoor air legislation for PM, the values found in this study can only be compared with limit values for ambient air. As indoor air quality is an important determinant of human health and comfort it is essential to establish regulations for indoor microenvironments. Generally, the PM<sub>2.5</sub> and PM<sub>10</sub> concentrations obtained in the outdoor spaces of the homes and schools were below the WHO guidelines.

LIFE Index-Air project ([www.lifeindexair.net](http://www.lifeindexair.net)) is developing an innovative, versatile and modular policy tool that establishes a relation between children exposure to PM compounds, health effects and emission sources. This tool combines a pack of models to select cost-effective improvement measures to protect human health. The exposure module of the tool calculates exposure from outdoor PM levels, indoor-to-outdoor concentrations and time activity patterns.

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