

# ASTHMATIC CHILDREN PERSONAL EXPOSURE AND INHALED DOSE OF AIR POLLUTANTS

**Joana Valente**, CESAM & Departamento de Ambiente e Ordenamento, Universidade de Aveiro, Aveiro, Portugal

**Pedro Martins**, CEDOC, Departamento de Fisiopatologia, Faculdade de Ciências Médicas (FCM), Universidade Nova de Lisboa, Lisbon, Portugal and Serviço de Imunoalergologia, Hospital de Dona Estefânia, Centro Hospitalar de Lisboa Central, EPE, Lisbon, Portugal

**Myriam Lopes**, CESAM & Departamento de Ambiente e Ordenamento, Universidade de Aveiro, Aveiro, Portugal

**Nuno Neuparth**, CEDOC, Departamento de Fisiopatologia, Faculdade de Ciências Médicas (FCM), Universidade Nova de Lisboa, Lisbon, Portugal and Serviço de Imunoalergologia, Hospital de Dona Estefânia, Centro Hospitalar de Lisboa Central, EPE, Lisbon, Portugal

**Ana Isabel Miranda**, CESAM & Departamento de Ambiente e Ordenamento, Universidade de Aveiro, Aveiro, Portugal

**Carlos Borrego**, CESAM & Departamento de Ambiente e Ordenamento, Universidade de Aveiro, Aveiro, Portugal

**Background and Aims:** The study presented focus on the determination of personal exposure and inhaled dose of air pollutants (PM, O<sub>3</sub>, NO<sub>2</sub>, BTEX and formaldehyde) in asthmatic children in Portugal. Association between exposure and dose of air pollutants and the respiratory health of children was investigated.

**Methods:** The ISAAC questionnaire has been applied to identify 60 asthmatic children that participated in the study. Personal exposure was calculated using a microenvironmental approach and inhaled dose was estimated according to different ventilation rates for each child, in each moment. Daily activity profiles for each child were established through personal questionnaires to parents and children and allowed the identification of the microenvironments (ME) frequented by those children and the activity level and time spent in each one. The air quality characterization of different ME (outdoor and indoor) was performed combining measurements and air quality modelling techniques.

**Results:** Results show significant differences in the contribution of the various ME to exposure and dose. Although exposure in ME where children have high activity levels may be low, the mass of pollutant inhaled there is high. Statistical association between health and air pollution data shows that children that have higher contact with air pollution have respiratory exams indicating lower health condition.

**Conclusions:** This study allowed the estimation of weekly personal exposures and inhaled doses of a set of pollutants, for summer and winter conditions. It reveals the importance of advancing in the chain of events that relate air pollution and health, showing that similar exposures can lead to quite different inhaled doses. The findings indicate the importance of controlling air quality in indoor sport facilities; children do not spend significant time in those environments, but it results in high inhaled doses.