

MODELLING POPULATION EXPOSURE TO URBAN AIR POLLUTION

C. Dimitroulopoulou¹, M.R. Ashmore², A.C. Terry²

¹*Environmental Engineering Centre, BRE Environment, Watford, UK*

²*Department of Environmental Science, University of Bradford, Bradford, UK*

Within any city, there is a large variation from individual to individual in their personal exposure to air pollution, depending on location, indoor and outdoor concentrations and activity patterns. The health benefits of policy measures to improve urban air quality are currently assessed by reference to outdoor concentrations at particular locations, but actually are more closely linked to changes in personal exposures within the population. More specifically, there is a need for tools to assess the impacts of different policy interventions on the personal exposure frequency distribution (PEFD) within the population. This paper describes a new modelling framework that simultaneously simulates the frequency distributions across an urban population of indoor concentrations and personal exposures to CO, NO₂, PM_{2.5} and PM₁₀. The results of applying the model for the four pollutants in the city of Leicester (UK) are used to demonstrate that policy interventions have different effects on PEFDs than on outdoor concentrations. Hence, it is important to consider personal exposures, as well as outdoor concentrations, if cost-effective air quality management options are to be identified.