Particle exposure and dosage on public transport

Erik Velasco
Singapore-MIT Alliance for Research and Technology (SMART), Singapore.

Short (hours) and even very short (< 1 h) exposure to high concentrations of traffic pollution may have significant health impacts. In modern cities like Singapore, Bangkok, Ho Chi Minh City and Mexico City transport microenvironments represent hotspots of personal exposure, particularly of ultrafine particles. Thus, a large proportion of exposure to particles is likely experienced during daily commuting trips.

A comprehensive assessment of the variability in exposure concentration across available transport modes (e.g. bus, subway, taxi, bicycle, walking) is therefore essential to be able to formulate efficient policies on public health and urban mobility strategies. This assessment must consider the physical and chemical characteristics of the particles, the total exposure for the entire trip as well as the spatial variation within each transport microenvironment. To provide useful information to reduce exposure it is necessary to assess the individual contributions from different spaces encountered during a trip (e.g. bus stop, train platform, taxi stand).

In addition to the exposure levels and characteristics of the particles, the travelling time and physical effort associated with each transport mode needs to be also considered. A comparison of the inhaled dose, or dosage, will determine at the end the best way of commuting in terms of exposure to airborne particles in a particular city.

This talk presents results from a series of studies designed to evaluate in-situ the exposure and dosage of particles experienced by dwellers of the cities mentioned above during their daily commutes. The findings are expected to contribute to the design of sustainable and clean systems of public transport that promotes a higher quality of life.