

EMERGING METHODOLOGIES FOR EXAMINING ENVIRONMENTAL INFLUENCES ON CHILDREN'S EXPOSURE TO AIR POLLUTION

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Background and Aims: Air pollution is a critical environmental and public health issue. Children are especially vulnerable to air pollution in their surroundings as they have higher ventilation rates, spend more time outdoors, and are more constrained in their mobility than adults. Most research relating health-related outcomes (e.g., asthma) to environmental factors (e.g., land uses) identifies correlations, but stops short of understanding how individuals interact with their surroundings. For example, PM2.5 is traditionally assessed using fixed or 'passive' monitors which assume homogeneity in pollution distribution over large areas, and have consistently under-reported actual personal exposure.

Methods: We address methodological shortcomings by providing a fuller understanding of the daily spatial and temporal routines of children in the spaces they inhabit. Using an innovative suite of portable, high-precision, personal monitoring tools (air pollution monitors, accelerometers, and GPS) we are able to combine 'active' measurements of PM2.5 exposure, energy expenditure, and geographic location at 1-second intervals throughout a child's day; in turn, we can identify environmental influences on children's activities and exposure to PM2.5. These tools were used to continuously monitor 36 children in a Canadian city (London) for one week; time-activity diaries, questionnaires, and interviews were used to provide additional context. GIS was used to visualize and analyze spatial-temporal patterns.

Results: This presentation will describe the innovative protocol and preliminary findings on how variations in children's levels of exposure to PM2.5 varies in relation to spatio-temporal variations in their activities and characteristics of their everyday environments (e.g., land use patterns, greenspace).

Conclusions: This study highlights the importance of 'active' versus 'passive' monitoring for more accurate assessments of exposure to air pollution. A better understanding of the spatial and temporal aspects of children's exposure to air pollution and the environmental context provides necessary evidence for formulating interventions to promote the health of children.