

ACUTE HEALTH EFFECTS OF TRAFFIC RELATED AIR POLLUTION AND INTERDEPENDENCIES WITH PHYSICAL ACTIVITY

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Background and Aims: The acute health responses in healthy populations resulting from exposure to traffic related air pollution remain unclear. Few studies have assessed simultaneously exposures and acute health markers associated with traffic related air pollution under real world conditions. Ambient factors can potentiate the adverse health responses compared to those shown in chamber studies. The role of physical activity as a potential effect modifier of such health effects is poorly understood. This project aims to determine the physiologic responses in a healthy population in Barcelona following short term exposures representative of a commuting environment under real world conditions.

Methods: Crossover study comparing the physiologic responses pre- and post-exposure to traffic related air pollution. Thirty non-smoking subjects are exposed for 2 hours to contrasting pollution levels while either cycling or resting. Each volunteer is to undergo all four conditions (high vs. low exposure; moderate physical activity vs. resting). Personal exposure monitoring involves particulate matters of different size diameters, NO_x, CO, CO₂, elemental carbon (EC), and noise levels. Health endpoints measurements include pulmonary function and inflammation, cardiovascular effects like blood pressure, heart rate variability and oxygen saturation. Blood and urine sampling serves for determination of short acting biomarkers and oxidative stress levels.

Results: Preliminary descriptive analysis from first sessions show concentrations of EC, NO_x, and ultrafine particles levels at the high exposure site on average 2, 4.2, and 3.2 times higher than the low exposure site, respectively. Associations with health responses in different sites will be reported in the course of the study.

Conclusions: Findings from this study are expected to inform about the health responses in different levels of air pollution associated with or without moderate physical activity as they appear in commuting, and thus allows deriving recommendations for planning transportation microenvironments that promote better physical and psychological wellbeing.