

Short Term Exposures to Air Pollution: Does Rest of Day Exposure Matter in Changing Short Term Cardiovascular Indicators in Bike Commuters?

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As a result of the high concentrations of air pollutants along urban roadways and increased respiration during exercise, bicycle commuters are at an increased risk to taking in large doses of fine particulate matter (PM_{2.5}) and black carbon (BC) during commutes. Short term exposures to these particulates have been associated with acute changes to systolic blood pressure. Our analysis aims to understand if exposure a cyclist experiences in the rest of their day affects the response to the air pollution taken in during commute. In a volunteer-based study, data was collected to determine dose and change to systolic blood pressure in the four hours following commute. The results revealed a greater increase systolic blood pressure in subjects who experienced relatively higher doses of fine particulate matter in the times which they were not biking. When looking at black carbon exposure, it was found that non-biking exposure had no significant effect. Due to statistically insignificant results, we were unable to determine how non-commute exposure affected an individual's sensitivity to change in blood pressure (that is the magnitude of change to systolic blood pressure based on a given dose) after exposure to PM_{2.5} or BC. From a public health standpoint, this analysis suggests that bikers should be considerate of the doses of fine particulate matter that they are exposed to both when biking and in the rest of their day.