

Impacts of roadway emissions on urban particulate matter concentrations in sub-Saharan Africa: new evidence from Nairobi, Kenya

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Abstract

Air quality is a serious and worsening problem in the rapidly growing cities of sub-Saharan Africa (SSA). However, the lack of ambient monitoring data, and particularly urban roadside concentrations for particulate matter in SSA cities severely hinders our ability to describe temporal and spatial patterns of concentrations, characterize exposure–response relationships for key health outcomes, estimate disease burdens, and promote policy initiatives to address air quality. As part of a collaborative transportation planning exercise between Columbia University and the University of Nairobi, air monitoring was carried out in February 2006 in Nairobi, Kenya. The objective of the monitoring was to collect pilot data on air concentrations (PM_{2.5} and black carbon) encountered while driving in the Nairobi metropolitan area, and to compare those data to simultaneous ‘urban background’ concentrations measured in Nairobi but away from roadways. For both the background and roadway monitoring, we used portable air sampling systems that collect integrated filter samples. Results from this pilot study found that roadway concentrations of PM_{2.5} were approximately 20-fold higher than those from the urban background site, whereas black carbon concentrations differed by 10-fold. If confirmed by more extensive sampling, these data would underscore the need for air quality and transportation planning and management directed at mitigating roadway pollution.

Keywords: urban particulate matter, roadway emissions, sub-Saharan, Nairobi

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