

# The Link Between Climate Change and Health: Air Pollution

Haider A. Khwaja

Wadsworth Center, Department of Environmental Health Sciences, School of Public Health, University at Albany,  
Albany, New York, USA

## ABSTRACT

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Air Pollution impacts on mortality and health are a significant public health issue worldwide. Population-based studies have documented health risks resulting from short-term exposure to air pollutants. World Health Organization (WHO) reports that air pollution has become the world's single biggest environmental health risk, linked to around 7 million – nearly one in eight deaths in 2012. Around 80% of the 3.7 million deaths from outdoor air pollution came due to stroke and heart disease, 11% from lung diseases, and 6% from cancers. Southeast Asia is now the most polluted region globally, with 2.6 million deaths related to outdoor air pollution. These new estimates are based not on a significant increase in pollution, but on improved knowledge of the links between air pollutants and cardiopulmonary diseases. We have investigated the short-term effects of PM<sub>2.5</sub> and black carbon (BC) in ambient air on hospital admissions and emergency room (ER) visits among residents living in a megacity of Southeast Asia. Daily records of hospitalizations and ER visits for cardiovascular diseases (CVD) at three major hospitals were collected. The 24 h concentrations of PM<sub>2.5</sub> were collected at two commercial/residential and industrial/residential sites. Single- and multi-pollutant lagged generalized linear time-series models were utilized to analyze daily counts of hospital, meteorological, and pollutant data. PM<sub>2.5</sub> and BC concentrations ranged 27 - 279 µg/m<sup>3</sup>, 1 - 32 µg/m<sup>3</sup>, respectively. Analysis showed the evidence of positive associations of PM<sub>2.5</sub>, meteorological factors, and seasonal parameters with ER visits and hospital admissions due to CVD in Karachi. Statistically strongest relationships were observed for all patients (RR = 1.499, 95% CI = 1.240 – 1.812 for Korangi; RR = 1.778, 95% CI = 1.349 – 2.345 for Tibet Center) and hospital admissions (RR = 1.613, 95% CI = 1.274 – 2.043 for Korangi; RR = 2.036, 95% CI = 1.424 – 2.911 for Tibet Center) for PM<sub>2.5</sub> concentrations (151 – 200 µg/m<sup>3</sup>). This study provides scientific evidence on the magnitude of health effects associated with air pollution in urban centers of large developing nations, evaluate BC as an additional indicator for evaluating health impacts associated with ambient air pollution, and finally, to provide scientists and policy makers with vital information for policy planning.

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