

SIZE-FRACTIONED PARTICULATE AIR POLLUTION AND CARDIOVASCULAR EMERGENCY ROOM VISITS IN BEIJING, CHINA

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Background and Aims: Associations between particulate air pollution and cardiovascular emergency room visits and hospital admissions have been consistently shown. It is, however, still not fully investigated which size fraction of particles might be responsible for this relationship, especially in Asia. We explored the association between daily cardiovascular emergency room visit counts and number concentrations (NC) or mass concentrations (MC) of particles of different size fractions in Beijing, China.

Methods: Standard medical forms recording date of visit and diagnosis were obtained. Cases of all cardiovascular diseases and cause-unknown sudden deaths together were referred as “total circulatory emergency room visits, ERVT”; severe cases of ischemic heart diseases, arrhythmia, heart failure and cerebrovascular diseases together were referred as “circulatory emergency room visits, ERV”. Particle number size distributions were continuously measured

between 3nm to 10µm and the data was used to calculate daily mean NC and MC by size fraction. Confounder-adjusted semi-parametric Poisson regression models were used to estimate the effects of lag 0 to lag 4, as well as the 5-day moving average NC and MC.

Results: Mainly particle NC of the size-fractions 10 to 30nm, 30 to 50nm, and 50 to 100nm showed adverse delayed effects (with lag 4) on ERV and ERVT; the relative risks (RR) ranged from 1.03 (95% confidence intervals (CI): 1.00-1.06) to 1.06 (95% CI: 1.02-1.10). For MC, most size-fractions showed significant effects on ERVT, predominantly at lag 0 with RR of about 1.03 (95% CI: 1.00-1.06). With MC in the size fraction 1000-2500nm also significant 1-day, 2-day and 4-day lagged effects (RR 1.02 (95% CI: 1.00-1.04) each) on ERVT were observed. However, no effects of MC were found for ERV.

Conclusions: Results from this analysis show an elevated risk of cardiovascular emergency room visits from short-term exposure to different size-fractions of particle NC and MC.