

Publication

Ambient particulate air pollution and daily mortality in 652 cities

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Author(s) Liu, Cong; Chen, Renjie; Sera, Francesco; Vicedo-Cabrera, Ana M.; Guo, Yuming; Tong, Shilu; Coelho, Micheline S. Z. S.; Saldiva, Paulo H. N.; Lavigne, Eric; Matus, Patricia; Valdes Ortega, Nicolas; Osorio Garcia, Samuel; Pascal, Mathilde; Stafoggia, Massimo; Scortichini, Matteo; Hashizume, Masahiro; Honda, Yasushi; Hurtado-Díaz, Magali; Cruz, Julio; Nunes, Baltazar; Teixeira, João P.; Kim, Ho; Tobias, Aurelio; Íñiguez, Carmen; Forsberg, Bertil; Åström, Christofer; Ragettli, Martina S.; Guo, Yue-Leon; Chen, Bing-Yu; Bell, Michelle L.; Wright, Caradee Y.; Scovronick, Noah; Garland, Rebecca M.; Milojevic, Ai; Kysely, Jan; Urban, Aleš; Orru, Hans; Indermitte, Ene; Jaakkola, Jouni J. K.; Rytö, Niilo R. I.; Katsouyanni, Klea; Analitis, Antonis; Zanobetti, Antonella; Schwartz, Joel; Chen, Jianmin; Wu, Tangchun; Cohen, Aaron; Gasparrini, Antonio; Kan, Haidong

Author(s) at UniBasel [Ragettli, Martina](#) ;

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The systematic evaluation of the results of time-series studies of air pollution is challenged by differences in model specification and publication bias.; We evaluated the associations of inhalable particulate matter (PM) with an aerodynamic diameter of 10 μm or less (PM₁₀;) and fine PM with an aerodynamic diameter of 2.5 μm or less (PM_{2.5};) with daily all-cause, cardiovascular, and respiratory mortality across multiple countries or regions. Daily data on mortality and air pollution were collected from 652 cities in 24 countries or regions. We used overdispersed generalized additive models with random-effects meta-analysis to investigate the associations. Two-pollutant models were fitted to test the robustness of the associations. Concentration-response curves from each city were pooled to allow global estimates to be derived.; On average, an increase of 10 μg per cubic meter in the 2-day moving average of PM₁₀ concentration, which represents the average over the current and previous day, was associated with increases of 0.44% (95% confidence interval [CI], 0.39 to 0.50) in daily all-cause mortality, 0.36% (95% CI, 0.30 to 0.43) in daily cardiovascular mortality, and 0.47% (95% CI, 0.35 to 0.58) in daily respiratory mortality. The corresponding increases in daily mortality for the same change in PM_{2.5} concentration were 0.68% (95% CI, 0.59 to 0.77), 0.55% (95% CI, 0.45 to 0.66), and 0.74% (95% CI, 0.53 to 0.95). These associations remained significant after adjustment for gaseous pollutants. Associations were stronger in locations with lower annual mean PM concentrations and higher annual mean temperatures. The pooled concentration-response curves showed a consistent increase in daily mortality with increasing PM concentration, with steeper slopes at lower PM concentrations.; Our data show independent associations between short-term exposure to PM₁₀ and PM_{2.5} and daily all-cause, cardiovascular, and respiratory mortality in more than 600 cities across the globe. These data reinforce the evidence of a link between mortality and PM concentration established in regional and local studies. (Funded by the

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