

Main air pollutants and Myocardial Infarction: A systematic review and meta-analysis

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Context: Short-term exposure to high levels of air pollution may trigger myocardial infarction (MI), but this association remains unclear.

Objective: To assess and quantify the association between short-term exposure to major air pollutants (ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter $\leq 10 \mu\text{m}$ [PM(10)] and $\leq 2.5 \mu\text{m}$ [PM(2.5)] in diameter) on MI risk.

Data Sources: EMBASE, Ovid MEDLINE in-process and other nonindexed citations, and Ovid MEDLINE (between 1948 and November 28, 2011), and EBM Reviews-Cochrane Central Register of Controlled Trials and EBM Reviews-Cochrane Database of Systematic Reviews (between 2005 and November 28, 2011) were searched for a combination of keywords related to the type of exposure (air pollution, ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM(10), and PM(2.5)) and to the type of outcome (MI, heart attack, acute coronary syndrome).

Study Selection: Two independent reviewers selected studies of any study design and in any language, using original data and investigating the association between short-term exposure (for up to 7 days) to 1 or more air pollutants and subsequent MI risk. Selection was performed from abstracts and titles and pursued by reviewing the full text of potentially eligible studies.

Data Extraction: Descriptive and quantitative information was extracted from each selected study. Using a random effects model, relative risks (RRs) and 95% CIs were calculated for each increment of $10 \mu\text{g}/\text{m}^3$ in pollutant concentration, with the exception of carbon monoxide, for which an increase of $1 \text{ mg}/\text{m}^3$ was considered.

Data Synthesis: After a detailed screening of 117 studies, 34 studies were identified. All the main air pollutants, with the exception of ozone, were significantly associated with an increase in MI risk (carbon monoxide: 1.048; 95% CI, 1.026-1.070; nitrogen dioxide: 1.011; 95% CI, 1.006-1.016; sulfur dioxide: 1.010; 95% CI, 1.003-1.017; PM(10): 1.006; 95% CI, 1.002-1.009; and PM(2.5): 1.025; 95% CI, 1.015-1.036). For ozone, the RR was 1.003 (95% CI, 0.997-1.010; $P = .36$). Subgroup analyses provided results comparable with those of the overall analyses. Population attributable fractions ranged between 0.6% and 4.5%, depending on the air pollutant.

Conclusion: All the main air pollutants, with the exception of ozone, were significantly associated with a near-term increase in MI risk.

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