# Long-term exposure to traffic-related air pollution and non-accidental mortality: a systematic review and meta-analysis

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Background The health effects of traffic-related air pollution (TRAP) continue to be of important public health interest across the globe. Following its 2010 review, the Health Effects Institute appointed a new expert Panel to systematically evaluate the epidemiological evidence regarding the associations between long-term exposure to TRAP and selected health outcomes. This paper describes the main findings of the systematic review on non-accidental mortality. Methods The Panel used a systematic approach to conduct the review. An extensive search was conducted of literature published between 1980 and 2019. A new exposure framework was developed to determine whether a study was sufficiently specific to TRAP, which included studies beyond the near-roadway environment. We performed random-effects meta-analysis when at least three estimates were available of an association between a specific exposure and outcome. We evaluated confidence in the evidence using a modified Office of Health Assessment and Translation (OHAT) approach, supplemented with a broader narrative synthesis. Results Thirty-six cohort studies were included. Virtually all studies adjusted for a large number of individual and area-level covariates-including smoking, body mass index, and individual and area-level socioeconomic status-and were judged at a low or moderate risk for bias. Most studies were conducted in North America and Europe, and a few were based in Asia and Australia. The meta-analytic summary estimates for nitrogen dioxide, elemental carbon and fine particulate matter-pollutants with more than 10 studies-were 1.04 (95% CI 1.01, 1.06), 1.02 (1.00, 1.04) and 1.03 (1.01, 1.05) per 10, 1 and 5 ţg/m3, respectively. Effect estimates are interpreted as the relative risk of mortality when the exposure differs with the selected increment. The confidence in the evidence for these pollutants was judged as high, because of upgrades for monotonic exposure-response and consistency across populations. The consistent findings across geographical regions, exposure assessment methods and confounder adjustment resulted in a high confidence rating using a narrative approach as well. Conclusions The overall confidence in the evidence for a positive association between long-term exposure to TRAP and non-accidental mortality was high.
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