

Publication

A systematic analysis of mutual effects of transportation noise and air pollution exposure on myocardial infarction mortality: a nationwide cohort study in Switzerland

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The present study aimed to disentangle the risk of the three major transportation noise sources-road, railway, and aircraft traffic-and the air pollutants NO₂ and PM_{2.5} on myocardial infarction (MI) mortality in Switzerland based on high quality/fine resolution exposure modelling.; We modelled long-term exposure to outdoor road traffic, railway, and aircraft noise levels, as well as NO₂ and PM_{2.5} concentration for each address of the 4.40 million adults (>30 years) in the Swiss National Cohort (SNC). We investigated the association between transportation noise/air pollution exposure and death due to MI during the follow-up period 2000-08, by adjusting noise [Lden(Road), Lden(Railway), and Lden(Air)] estimates for NO₂ and/or PM_{2.5} and vice versa by multipollutant Cox regression models considering potential confounders. Adjusting noise risk estimates of MI for NO₂ and/or PM_{2.5} did not change the hazard ratios (HRs) per 10 dB increase in road traffic (without air pollution: 1.032, 95% CI: 1.014-1.051, adjusted for NO₂ and PM_{2.5}: 1.034, 95% CI: 1.014-1.055), railway traffic (1.020, 95% CI: 1.007-1.033 vs. 1.020, 95% CI: 1.007-1.033), and aircraft traffic noise (1.025, 95% CI: 1.006-1.045 vs. 1.025, 95% CI: 1.005-1.046). Conversely, noise adjusted HRs for air pollutants were lower than corresponding estimates without noise adjustment. Hazard ratio per 10 µg/m³ increase with and without noise adjustment were 1.024 (1.005-1.043) vs. 0.990 (0.965-1.016) for NO₂ and 1.054 (1.013-1.093) vs. 1.019 (0.971-1.071) for PM_{2.5}.; Our study suggests that transportation noise is associated with MI mortality, independent from air pollution. Air pollution studies not adequately adjusting for transportation noise exposure may overestimate the cardiovascular disease burden of air pollution.

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