IMPACT OF AIR POLLUTION AND TRANSPORTATION NOISE ON BLOOD PRESSURE IN THE SWISS STUDY ON AIR POLLUTION AND LUNG AND HEART DISEASES (SAPALDIA)

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Background and Aims: Air pollution has been associated with cardiovascular endpoints previously, however, the impact on blood pressure remains controversial. Positive associations have been found in studies on short-term ambient and personal measures, while studies using long term ambient air pollution largely fail to show an association. We aimed at investigating the association between long-term ambient air pollution and blood pressure and potential confounding or interaction by transportation noise.

Methods: Blood pressure was measured in 6450 SAPALDIA participants, age 29-73. Annual average ambient air pollution exposure ($\mu g/m3$) of the year prior to exam was predicted by dispersion (PM10, source specific PM10, PM2.5) and a hybrid land-use regression model (NO2). Multivariable linear regression was run, adjusting for potential confounders and predictors of hypertension. Interaction between transportation noise and air pollution is to be tested.

Results: We found borderline significant negative associations for each of the PM estimates, with exception of railway specific PM10. For SBP the largest negative estimate was found for traffic specific PM10 (β= -0.40, 95%CI -0.85;0.05), then PM2.5 (SBP β= -0.19, 95%CI. -0.39;0.01) and the least by PM10 (SBP β= -0.11, 95%CI -0.25;0.02). Effects estimated for DBP are at -0.02 with varying CI for all exposures variables. Railway specific PM10 was positively associated with blood pressure and highly collinear with railway noise. Railway noise was a significant covariate positively associated with SBP and DBP.

Conclusion: The first preliminary analyses yielded consistent negative associations with blood pressure for all traffic related air pollution indicators. The air pollution effect was not confounded by noise. Further analyses, testing additional potential confounders and a vulnerable population approach are underway trying to explain the observed inverse associations. Different exposure time windows will be tested next to capture the actual long-term effect and potential interaction between PM and transportation noise will be investigated.