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Title: Effect of long-term exposure to traffic-related air pollution and COPD- The multi-centre ESCAPE project

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Body: Background: The role of air pollution in the development of Chronic Obstructive Pulmonary Disease (COPD) remains uncertain. Aim: To assess the impact of long-term exposure to traffic related air pollution on the prevalence and incidence of COPD in four European cohorts using the newly developed fully standardized ESCAPE exposure estimates. Method: Annual concentrations of NO_2, NOx, $PM_{2.5}$, PM_{10} at the home addresses were estimated using land-use regression models. COPD was classified using the fixed ratio (GOLD) definition and for comparison the lower limit of normal (LLN). Models were adjusted for age, sex, BMI, education and smoking. Results: In total, we included 7,023 subjects with NO_2 and 3,580 with PM_{10} measures. COPD prevalence and incidence was not significantly associated with NO_2 or PM_{10} in any of the cohorts using either definition, however, the estimates tended to be slightly higher for LLN. In the meta-analyses, all markers of pollution, with exception of $PM_{2.5}$, were positively but not significantly associated with COPD. Stratification by gender yielded a stronger effect estimate in females when using the LLN. The meta-analyses for COPD incidence showed an overall estimate of 1.10 (95%CI: 0.96,1.26) for a 10μg/m³ increase in NO_2 and 1.18 (95%CI: 0.80, 1.72) for a 10μg/m³ increase in PM_{10} using the LLN. Conclusion: Our findings indicate an inconsistent association between long-term exposure to air pollution and COPD prevalence and incidence with both definitions. Further investigation will be needed to address the reasons for these inconsistencies.