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Lack of association between air pollutants and telomere length: findings from the UK Biobank study

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Abstract

Background: Air pollution has been extensively associated with diseases more common in the elderly, and with disease risk factors associated with ageing such as atherosclerosis and reduced lung function. Shorter telomere length (TL) is often considered a biological marker of advanced biological ageing, also and is associated with the risk of many age-related degenerative diseases. Common mechanisms of oxidative stress and inflammation have been identified for TL shortening and air pollution damage. There are few studies of air pollution and TL in adults, but associations were seen between in utero and early life air pollution exposures and shorter TL at age 8 years in the HELIX study (Clemente, 2019). **Methods:** We investigated cross-sectional associations between European Study of Cohorts and Air Pollution Effects (ESCAPE) modelled air pollutants (NO₂, NO, PM₁₀, PM_{2.5}, PM_{2.5}absorbance, PM_{coarse}) and leucocyte TL (LTL) in 299,786 UK Biobank participants. We used multivariable linear regression models adjusted for age, sex, ethnicity, white cell blood count, deprivation, family income, education, and smoking. **Results:** The association between any air pollutant and LTL was negligible, after accounting for major determinants of LTL, socio-economic status and smoking. Findings were unchanged in multiple imputation models to investigate impact of missing confounders, and when stratifying by deprivation quintile. **Conclusions:** Studies using UK Biobank have found associations between air pollution and organ damage also associated with ageing such as reduced lung function (Doiron, 2019), but we did not find associations with TL shortening in cross-sectional analyses, suggesting air pollution mediated TL damage is unlikely to be a key mechanism. However, findings need confirmation in longitudinal analyses, ideally complemented by experimental studies and further epidemiological studies investigating other air pollutants. **Keywords:** Air pollution; Ageing; Telomere length



