Application number/Title: 41535 - Associations between air quality, regional brain volumes, cognitive functioning, and neuropsychiatric outcome in middle-aged and older adults: a cross-sectional study

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Keywords provided by the Applicant PI to describe the research project:
air pollution, bipolar disorder, brain morphology, cognition, depression, neurodegeneration

Application Lay Summary:
In this study, we aim to identify and elucidate associations in adults between exposure to air pollution and cognitive function, mood disorders, and brain structure.

Exposure to air pollution has been associated with increased risk for respiratory and cardiovascular disease, and recent work suggests an association between exposure to air pollution and worsened cognitive function in children and adults and possibly dementia. In that air pollution has been associated with cognitive function, we hypothesize that it might be associated with the mood disorders depression and bipolar disorder. In addition, air pollution has been associated with abnormal brain volume in children and adults. Air pollution might be associated with cognitive function via damage to the protective blood-brain barrier or inflammation. We propose to use data from the UK Biobank to investigate further the relationship between exposure to air pollution and cognitive and mood outcomes and brain volumes. To identify factors that might influence any associations between air pollution and cognition, mood disorders, and brain volume, we plan to investigate the potential effects of several medical and social variables, such as age, sex, and educational attainment.

If this application is successful, we anticipate completing the project in six months after receiving the data.

Given the numbers of people including children worldwide exposed to air pollution, this research is critically important for informing public health interventions and policies.
pollution and findings showing possible associations between exposure to air pollution and cognitive development, cognitive function, and brain volume, additional information characterizing these associations in large, controlled studies are vital for public interest and global health, particularly considering increasing global urbanization and subsequent exposure to air pollution. Identification of risk and protective factors is also important in better understanding the effects of air pollution on cognitive and mental health.