DIABETES INCIDENCE AND LONG-TERM EXPOSURE TO AIR POLLUTION: A COHORT STUDY

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Background and Aims: Emerging data from cross-sectional epidemiological and animal studies suggest air pollution as a risk factor for diabetes, whereas prospective data are sparse and conflicting, precluding conclusions about causality. We examined the association between exposure to traffic-related air pollution over 35 years and incident diabetes in a prospective cohort study.

Methods: We followed 57,053 participants of the Danish Diet, Cancer and Health cohort in the Danish National Diabetes Register between baseline (1993-1997) and 2006 and used two definitions of incident diabetes: original from Diabetes Register and more strict, by excluding those with unconfirmed diabetes diagnoses. We estimated the annual mean levels of nitrogen dioxide (NO2) at residential addresses of the cohort participants since 1971 and modeled association between mean NO2 levels and incident diabetes by Cox regression analyses. We tested for modification of the effect of air pollution by gender, body mass index, waist-to-hip ratio, smoking status, physical activity, educational level, and cardiovascular diseases.

Results: Over a mean follow-up of 9.7 years of 51,818 eligible subjects, there were 4,040 (7.8%) and 2,877 (5.5%) diabetes cases with all original and confirmed only diabetes cases, respectively. We found no association between mean levels of NO2 since 1971 and diabetes according to the original definition (hazard ratio 1.00; 95% confidence interval 0.97-1.04, per IQR of 4.9 µg/m3), whereas borderline significant association was detected when using the modified definition of diabetes, (1.04; 1.00-1.08). Identical associations were observed with mean NO2 levels since 1991 and 1-year mean at the follow-up (mean exposure during the year prior to stroke), and attenuated with 1-year mean at baseline (1.02; 0.98-1.05). Non-smokers, physically active, and those generally more healthy, seemed to be most susceptible to the effects of air pollution.

Conclusions: Long-term exposure to traffic related air pollution may contribute to the development of diabetes.