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 (NO_2) at residential addresses of the cohort participants since 1971 and modeled association between mean NO_2 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 NO_2 since 1971 and diabetes according to the original definition (hazard ratio1.00; 95% confidence interval 0.97-1.04, per IQR of 4.9 $\mu g/m^3$), 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 NO_2 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.