LONG-TERM EXPOSURE TO ROAD TRAFFIC AND MORTALITY IN A PROSPECTIVE COHORT OF WOMEN IN GERMANY

Joachim Heinrich, Helmholtz Zentrum München - German Research Center for Environment and Health, Institute of Epidemiology, Neuherberg, Germany

Elisabeth Thiering, Helmholtz Zentrum München - German Research Center for Environment and Health, Institute of Epidemiology, Neuherberg, Germany

Ursula Krämer, Institut für Umweltmedizinische Forschung (IUF) at the Heinrich-Heine-University of Düsseldorf, Düsseldorf, Germany

Matthias Hochadel, Helmholtz Zentrum München - German Research Center for Environment and Health, Institute of Epidemiology, Neuherberg, Germany- Institut für Herzinfarktforschung at the University of Heidelberg, Ludwigshafen, Germany


Ulrike Gehring, Helmholtz Zentrum München - German Research Center for Environment and Health, Institute of Epidemiology, Neuherberg, Germany - Utrecht University, Institute for Risk Assessment Sciences, Utrecht, The Netherlands

H.-Erich Wichmann, Helmholtz Zentrum München - German Research Center for Environment and Health, Institute of Epidemiology, Neuherberg, Germany - Ludwig-Maximilians-University of Munich, Institute of Medical Informations, Biometrics and Epidemiology, Chair of Epidemiology, Munich, Germany

Objective and aim: We assess whether long-term exposure to traffic-related air pollution is associated with all-cause, cause-specific and lung cancer mortality during a period of declining concentration of particulate matter.

Methods: A cohort of approximately 4800 women (age 55 years) from the Rhine-Ruhr area, Germany, was followed for up to 18 years. Exposure to traffic-related air pollution was defined by distance of residential address to nearest major roads calculated from GIS. Furthermore, one year average PM$_{10}$ and NO$_2$ concentrations were available (calculated from air-monitoring station data in close vicinity to residents of the subjects). Ninety-two per cent of all subjects lived in the same community during follow up.

Results: Sixteen per cent of the women died during the follow-up period.

1) Distance to roads: Living closer than 50 m (vs. more than 50 m) from a busy road showed an elevated total mortality adjusted for smoking and educational level: RR=1.47 (1.16 – 1.85). For cardiopulmonary mortality the elevation was even higher: RR=1.68 (1.17- 2.41).

2) PM$_{10}$: An increment of 7 µg/m$^3$ PM$_{10}$ (interquartile range) increased all-cause mortality after adjustment for smoking and educational level (HR 1.19, 95% CI (1.07-1.31)), cardiopulmonary mortality (HR 1.47, 95% CI (1.25-1.73)), and lung cancer mortality (HR 1.59, 95% CI (1.06-2.39))

3) NO$_2$: An increase in exposure to NO$_2$ by 16 µg/m$^3$ (interquartile range) was associated with an increased hazard ratio for total (HR 1.18, 95% CI (1.07-1.30), cardiopulmonary (HR 1.91, 95% CI (1.60-2.28), and respiratory mortality (HR 2.03, 95% CI (1.26 – 3.27) after adjustment for smoking and educational level).

4) Trend: Cardiopulmonary mortality related to PM was reduced for the extended follow-up with lower PM$_{10}$ concentration, but not with NO$_2$ for which the concentrations were reduced only minor.

Conclusions: Long-term exposure to traffic-related air pollution increases all-cause, cardiopulmonary and lung cancer mortality in region with high traffic load in Germany.