

LUNG CANCER AND ELEMENTAL CARBON EXPOSURE IN US TRUCKING INDUSTRY WORKERS

Eric Garshick, Pulmonary and Critical Care Medicine Section, Medical Service, VA Boston Healthcare System and Channing Laboratory, Brigham and Women's Hospital and Harvard Medical School, Boston, MA, USA

Jaime E Hart, Channing Laboratory, Brigham and Women's Hospital and Harvard Medical School and Department of Epidemiology, Harvard School of Public Health, Boston, MA, USA

Mary E Davis, Department of Urban and Environmental Policy and Planning, Tufts University, Medford, MA and Department of Environmental Health, Harvard School of Public Health, Boston, MA, USA

Thomas J Smith, Department of Environmental Health, Harvard School of Public Health, Boston, MA, USA

Francine Laden, Channing Laboratory, Brigham and Women's Hospital and Harvard Medical School and Departments of Epidemiology and Environmental Health, Harvard School of Public Health, Boston, MA, USA

Background and Aims: An elevated risk of lung cancer in truck drivers has been attributed to vehicle exhaust exposure. We established a large retrospective cohort of trucking company workers to assess the association of lung cancer mortality and elemental carbon (EC, as a measure of vehicle exhaust exposure).

Methods: Work records were obtained for 31,135 male workers age 40+ employed in the unionized US trucking industry in 1985. Lung cancer mortality was assessed through 2000 using the US National Death Index. An industrial hygiene review and current exposure measurements were used to develop annual historical estimates of EC by work location for all job groups. Cox proportional hazards models adjusted for age, race, calendar year, decade of hire, region of the country, and the healthy worker survivor effect were used to examine the association of EC exposure and risk of lung cancer mortality. Exposures were categorized as the cumulative sum of exposure and the cumulative sum disregarding the 5 years of exposure prior to death, i.e., with a 5- year exposure lag.

Results: 779 lung cancer deaths occurred during 424,668 years of person-time. With a 5-year exposure lag, compared to those in the lowest quartile of EC exposure, the hazard ratios were 1.32 (95%CI: 1.01-1.71), 1.37 (95%CI: 1.02-1.85), and 1.37 (95%CI: 0.99-1.91) for those in the second, third, and fourth quartiles, respectively.

Conclusions: Trucking industry workers with regular exposure to vehicle exhaust from diesel and other types of vehicles on highways, city streets, and loading docks have an elevated risk of lung cancer with greater EC exposures. However, the relationship between cumulative EC exposure and lung cancer risk does not appear to be linear.