

## A RETROSPECTIVE ASSESSMENT OF OCCUPATIONAL EXPOSURE TO ELEMENTAL CARBON IN THE U.S. TRUCKING INDUSTRY

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**Background and Aim:** Despite considerable epidemiologic evidence about the health effects of chronic exposure to vehicle exhaust, efforts at defining the extent of risk have been limited by the lack of historical exposure measurements suitable for use in epidemiologic studies and for risk assessment. We seek to reconstruct exposure to elemental carbon (EC), a marker of diesel and other vehicle exhaust exposure, for a large national cohort of 55,000 US trucking industry workers enrolled in 1985 and evaluated for mortality in 2000.

**Methods:** Using a national set of measurements collected from 2001-2005, we identify the predictors of exposure in a statistical model, which is used to extrapolate exposures across the cohort nationally. These estimates are adjusted for changes in work-related conditions over time using a previous exposure assessment of this industry, and for changes in background levels with a trend analysis of historical air pollution data.

**Results:** We construct monthly estimates of EC exposure for each job and trucking terminal combination between 1971 and 2000. Occupational exposure to EC declined substantially over time, and there is significant variability in exposures both within and across job groups, trucking terminals, and regions of the US. Average EC exposures during a typical work shift ranged from less than 1  $\mu\text{g}/\text{m}^3$  in the lowest exposed category in the 1990s to over 40  $\mu\text{g}/\text{m}^3$  for workers in the highest exposed jobs in the 1970s.

**Conclusions:** Our results provide a framework for understanding changes over time in exposure to EC in the US trucking industry. Our assessment should minimize exposure misclassification by capturing between freight terminal differences, including across US regions and across time.