

Air pollution and human health

Diesel emissions not only a concern in the occupational environment

In 2012 the International Agency for Research on Cancer (IARC) classified diesel emissions, with elemental carbon (EC) as a proxy for these emissions, as being a confirmed human carcinogen. In addition to the large number of workers exposed to relatively high concentrations in an occupational environment, the public are also exposed to diesel emissions in an urban environment.

The authors performed meta-regression on the results of the studies that were used by the IARC to classify diesel emissions as being the cause of lung cancer. Based on the Relative Risk (RR) determined in these studies, and assuming a lag time of 5 years, they estimated that if the general public is exposed to an average EC concentration of $0.8 \mu\text{g}/\text{m}^3$ over a lifetime of 80 years, there will be 21 incremental (over and above the background cases) lung cancer deaths per 10,000 individuals, compared to an unexposed population. This figure is much higher than the globally acceptable value of 1 in a 100 000 individuals.

For occupational exposures of 25-, 10-, and $1 \mu\text{g}/\text{m}^3$ EC over 45 years (with a 5-year lag time), the authors estimated that there will be incremental lifetime lung cancer mortality rates of 689, 200, and 17 per 10,000 individuals respectively.

Vermeulen R, Silverman DT, Garshick E, Vlaanderen J, Portengen L, Steenland K. 2014. Exposure-response estimates for diesel engine exhaust and lung cancer mortality based on data from three occupational cohorts. *Environ Health Perspect* 122:172–177; <http://dx.doi.org/10.1289/ehp.1306880>

Long-term exposure to fine particulate air pollution associated with natural-cause mortality

Using data from 22 European cohort studies (sample size of 367 251 participants) within the multicentre European Study of Cohorts for Air Pollution Effects (ESCAPE), this investigation aimed to investigate the association between natural-cause mortality and long-term exposure to several air pollutants. Residential exposure to air pollutants, including annual average concentrations of particulate matter ($\text{PM}_{2.5}$, PM_{10} , $\text{PM}_{\text{coarse}}$, $\text{PM}_{2.5}$ absorbance, NO_2 and NO_x) was assessed with land use regression models. Traffic intensity was also included. Using cohort-specific statistical analyses and adjusting for confounders, pooled effect estimates were obtained through a random-effects meta-analysis. A total of 29 076 participants died from natural causes during follow-up (average 13.9 years). Hazard ratios for $\text{PM}_{2.5}$ were significantly increased, remaining so when including only participants exposed to $\text{PM}_{2.5}$ concentrations lower than the European annual mean limit value ($25 \mu\text{g}/\text{m}^3$). Hence, long-term exposure to fine particulate air pollution was associated with natural-cause mortality.

Beelen et al. Effects of long-term exposure to air pollution on natural-cause mortality: an analysis of 22 European cohorts within the multicentre ESCAPE project. *The Lancet*. 2013; doi:10.1016/S0140-6736(13)62158-3. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(13\)62158-3/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)62158-3/abstract)