

# Studies show exposure to diesel exhaust may increase lung cancer mortality

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Heavy diesel exhaust (DE) exposure in humans may increase the risk of dying from lung cancer, according to two papers released March 2nd by the *Journal of the National Cancer Institute*.

Starting in the 1980s, studies have investigated a possible [causal relationship](#) between exposure to [diesel exhaust](#) and lung cancer. In 1989, the International Agency for Research on Cancer (IARC) classified diesel exhaust as a probable [carcinogen](#).

To determine the association between diesel exhaust exposure and the risk of dying from lung cancer, Michael D. Attfield, Ph.D., formerly of the National Institute for Occupational Safety and Health, in Morgantown, West Virginia, Debra T. Silverman, Sc.D., of the National Cancer Institute, and colleagues, conducted a [cohort study](#) of 12 315 workers in eight underground nonmetal mining facilities, called the Diesel Exhaust in Miners Study. Information was collected on workers starting in the year of introduction of diesel-powered equipment in each facility (between 1947 and 1967) to the end of the follow-up period on Dec. 31, 1997. The authors estimated the exposure of each worker to respirable elemental carbon (REC), a surrogate for diesel exhaust exposure, from a variety of sources including a 1998-2001 survey of diesel exhaust exposure at each facility, data from the US Mine Safety and Health Administration Mine Information Data Analysis System compliance database, data on diesel equipment usage over time at each facility, and historical mine ventilation data.

The researchers found a statistically significantly increased risk of lung cancer with increasing REC exposure among underground workers. Some evidence of increased risk was also shown for longer-term workers above ground who were exposed to elevated levels of REC. Other workplace exposures such as silica, asbestos, non-diesel exhaust-related polycyclic [aromatic hydrocarbons](#), respirable dust, and radon, had little or no effect on the findings.

Silverman, lead author of the study, and her colleagues conducted another study, a nested case-control study of lung cancer deaths in 198 workers, drawn from the same cohort of workers in the original study. In the nested case-control study, the researchers also found a statistically significantly increased risk of lung cancer mortality with increasing levels of exposure to REC, after adjusting for smoking history, employment in high-risk occupations for lung cancer, and history of nonmalignant respiratory diseases.

Silverman writes, "Our findings are important not only for miners but also for the 1.4 million American workers and the 3 million European workers exposed to diesel exhaust and for urban populations worldwide," adding that in past decades, cities such as Mexico City, Estarreja, Portugal, and nine urban centers in China have reported diesel exposure levels comparable to some underground workers in the lower range of diesel exposure found in this study.

"Because such workers had at least a 50% increased lung cancer risk, our results suggest that the high air concentrations of elemental carbon reported in some urban areas may confer increased risk of lung cancer," Silverman continues. "Thus, if the diesel exhaust/[lung cancer](#) relation is causal, the public health burden of the carcinogenicity of inhaled diesel exhaust in workers and in populations of urban areas with high levels of diesel exposure may be substantial."

Silverman and colleagues point out certain limitations of their study, namely the uncertainty in retrospective exposure assessment and information on workers' hazardous exposures before and after the study job, and the fact that certain lifestyle factors, such as smoking, were obtained from next of kin.

In an accompanying editorial, Lesley Rushton, Ph.D., of Imperial College in London, writes that this sharp rise in risk at lower levels of diesel exposure necessitates "stringent occupational and particularly environmental standards for DE exposure." Her suggestions include: improving ventilation and regular vehicle maintenance, limiting workers' time in vehicles, and turning off engines when vehicles are not in use. Furthermore, reducing carbon exposure in the general environment poses an imminent challenge. "The necessity for such reduction is becoming increasingly apparent and is essential if the health of large numbers of people is not to be compromised," Rushton writes.

Provided by Journal of the National Cancer Institute

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