

Focus on IFA's work

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Diesel motor emissions and lung cancer: a summary of epidemiological studies

Problem

Diesel motors and engines have been in use in many branches of industry since the beginning of the 1950s. Diesel motor emissions (DME) are quite significant particularly in deep mining, construction, the construction of bridges and tunnels, railways, public transportation, loading and unloading ships, and in agriculture. People who drive trucks, cars, buses, fork-lift trucks, and fire engines, as well as those who operate machinery or work as mechanics can be exposed to DMEs.

DME are listed as carcinogenic in humans. An association between DME and lung cancer has long been suspected, but epidemiological evidence and a dose-response relationship is still under scientifically controversial discussion. Epidemiological studies analysing this connection have contradictory findings.

Activities

To critically evaluate the association between diesel motor emissions exposure and the risk of lung cancer, a systematic review of published epidemiological evidences was done.

To comprehensively identify original studies on the association between DME exposure and the risk of lung cancer, literature searches were performed in literature databases for the period between 1970 and 2013, including bibliographies and cross-referencing. In total, 42 cohort studies and 32 case-control studies were identified in which the association between DME exposures and lung



Diesel motor emissions from exhaust gases

cancer was examined. In general, previous studies suffer from a series of methodological limitations, including design, exposure assessment methods and statistical analysis used. A lack of objective exposure information appears to be the main problem in interpreting epidemiological evidence. To facilitate the interpretation and comparison of previous studies, a job-exposure matrix (JEM) of DME exposures was created based on around 4,000 historical industrial measurements. The values from the JEM were considered during interpretation and comparison of previous studies.

Results and Application

Overall, neither cohort nor case-control studies indicate a clear exposure-response relationship between DME exposure and lung cancer. Epidemiological studies published to date do not allow a valid quantification of the association between DME and lung cancer.

Area of Application

Industries in mining, construction, transportation, railways, ports, agriculture, and motor mechanics; committees on setting safety limit values.

Additional Information

- Sun, Y; Bochmann, F.; Nold, A.; Mattenklott, M.: Diesel exhaust exposure and the risk of lung cancer – a review of the epidemiological evidence. *Int. J. Environ. Res. Public Health* 11 (2014) No. 2, pp. 1312-1340
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Expert Assistance

IFA, Division 1: Information technology – Risk management

Literature Requests

IFA, Central Division