

TABLE VII.—8.—STUDIES AND REVIEW OF ARTICLE ON CANCER EFFECTS, 2000–2002—Continued

Authors, year	Description	Key results
Boffetta and Silverman, 2001	Meta-analysis performed on 44 independent results from 29 distinct studies of bladder cancer in occupational groups having varying exposure to diesel exhaust (studies included only if at least 5 years between first exposure and bladder cancer development). Separate quantitative meta-analyses performed for heavy equipment operators, truck drivers, bus drivers, and studies with semi-quantitative exposure assessments based on a job exposure matrix (JEM).	Overall Relative Risk (RR) was 1.37 for heavy equipment operators, 1.17 for truck drivers, 1.33 for bus drivers, and 1.13 for JEM. Quantitative meta-analysis also performed on 8 independent studies showing results for “high” diesel exposure. Combined results were RR=1.23 for “any exposure,” and RR=1.44 for “high exposure.”
Zeegers <i>et al.</i> , 2001	Prospective case-cohort study involving 98 bladder cancer cases among men occupationally exposed to diesel exhaust. A cohort of 58,279 men who were 55–69 years old in 1986 was followed up through 1992. Exposure assessed by job history given on self-administered questionnaire, combined with expert assessment of exposure probability. “Cumulative probability of exposure” determined by multiplying job duration by exposure probability. Four categories of relative cumulative exposure probability defined: none, lowest third, middle third, highest third. Relative risks adjusted for age, cigarette smoking, and exposure to other occupational risk factors.	Relative risk for category with highest cumulative probability of exposure was 1.17.
Ojajarvi <i>et al.</i> , 2000	Meta-analysis of 161 independent results (populations) from 92 studies on relationship between worksite exposures and pancreatic cancer.	Based on 20 populations, no elevated risk associated with diesel exposure. Combined relative risk was 1.0. This result consistent with existing risk assessment which identified lung and bladder cancer as the only forms of cancer for which there was evidence of an association with DPM exposure.
Szadkowska-stanczyk and Ruszkowska, 2000.	Literature review of studies relating to carcinogenic effects of diesel emissions. (Article in Polish; MSHA had access only to English translation of Abstract.).	Authors conclude long-term exposure (>20 years) associated with 30% to 40% increase in lung cancer risk in workers in transport industry.

TABLE VI.—8.—STUDIES ON TOXICOLOGICAL EFFECTS OF DPM EXPOSURE, 2000–2002

Authors, Year	Description	Key results	Agent(s) of toxicity
Al-Humadi <i>et al.</i> , 2002	IT instillation in rats of 5 mg/kg saline, DPM, or carbon black.	Exposure to DPM or carbon black augments OVA sensitization; particle composition (of DPM) may not be critical for adjuvant effect.	DPM and carbon black particles.
Bünger <i>et al.</i> , 2000	In Vitro: assessment of content of polynuclear aromatic compounds and mutagenicity of DPM generated from four fuels, Ames assay used.	Production of black carbon and polynuclear aromatic engine compounds that are mutagenic; correlation with sulfur content of fuel and engine speed.	DE generated from diesel engine DPM collected on filters and soluble organic extracts prepared.
Carero <i>et al.</i> , 2001	In Vitro: assessment of DPM, carbon black, and urban particulate matter genotoxicity, human alveolar epithelial cells used.	DNA damage produced, but no cytotoxicity produced.	DPM, urban particulate matter (UPM), and carbon black (CB). DPM, UPM purchased from NIST, CB purchased from Cabot.
Castranova <i>et al.</i> , 2001	In Vitro: assessment of DPM on alveolar macrophage functions and role of adsorbed chemicals; rat alveolar macrophages used. In Vivo: assessment of DPM on alveolar macrophage functions and role of adsorbed chemicals, use of IT instillation in rats.	DPM depresses antimicrobial potential of macrophages, thereby increasing susceptibility of lung to infections, this inhibitory effect due to adsorbed chemicals rather than carbon core of DPM.	No information on generation of DPM (details may be found in previous publications from this lab).