

PULP AND PAPER MANUFACTURE (Group 3)

A. Evidence for carcinogenicity to humans (*inadequate*)

Excess incidences of oral and pharyngeal and/ or laryngeal cancers were reported in two studies designed to generate hypotheses. These cancer forms have not been evaluated in independent studies¹.

Some studies, based on a few cases, suggest that an increased risk of lymphoproliferative neoplasms, particularly Hodgkin's disease, may be linked to employment in the pulp and paper industries¹⁻³.

In a prospective cohort study of viscose workers exposed to carbon disulphide, 343 pulp and paper workers served as the reference group. During 15 years of follow-up, nine pulp and paper workers had died of lung cancer, compared with four viscose workers (rate ratio, 2.2; [95% confidence interval, 0.7-6.7]). The pulp and paper workers smoked slightly less than the viscose workers⁴. When national rates were used as the reference, the SMR was 154 (70-292). However, a US proportionate mortality study³ comprising 2113 deaths revealed no excess of lung cancer among pulp and paper workers.

A US cohort study of 3572 pulp and paper mill workers employed for at least one year between 1945 and 1955 and followed until 1977 showed statistically nonsignificant excesses of lymphosarcoma and reticulosarcoma (10 cases; SMR, 169; 92-287) and of stomach cancer (17 cases; SMR, 123; 78-185). There was no excess of lung cancer. The excess of lymphosarcoma and reticulosarcoma was present only for men who had worked in sulphate mills (6 observed; SMR, 207; 90-408), whereas the excess of stomach cancer occurred in sulphite mills (11 observed; SMR, 149; 83-246)⁵.

Excesses of cancers at miscellaneous sites have been mentioned in some studies on pulp and paper workers^{1,3,6-8}. The findings may be due to chance, because the cases were generally few and the patterns inconsistent.

A case-control study of the paternal occupations of 692 children who had died of cancer in Massachusetts, USA, showed that paternal employment as a pulp or paper mill worker was associated with tumours of the brain and other parts of the nervous system (six cases observed; relative risk, 2.8); however, as many comparisons were made, this may well be a chance finding⁹.

B. Other relevant data

Workers employed for two to 30 years in a paper factory and exposed intermittently to high levels of formaldehyde (see p. 211) for short periods showed a significant increase in the incidence of structural chromosomal aberrations associated with mean exposure to formaldehyde; however, no increase in the incidence of sister chromatid exchanges was observed as compared with controls. An increase in the incidence of chromosomal and chromatid-type aberrations was reported among seven workers involved in boiling pulp and handling sulphuric acid in a sulphite factory, as compared to six workers exposed to chlorine during the bleaching of pulp, six workers exposed to dust in a paper mill and 15 control subjects; but the results remain uncertain due to methodological problems¹⁰.

References

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