

LUMBER AND SAWMILL INDUSTRIES (INCLUDING LOGGING) (Group 3)

Evidence for carcinogenicity to humans (*inadequate*)

Information on the occurrence of cancer in lumber and sawmill workers is limited. The available epidemiological data come primarily from surveys of statements of occupation on death certificates. Nasal tumours, malignant lymphomas and leukaemias and soft-tissue sarcomas have been linked with work in the lumber and sawmill industries, but the results are not consistent¹.

In a case-control study based on an analysis of occupational data in the hospital records of 121 men seen for nasal cancer in British Columbia, Canada, between 1939 and 1977, a relative risk of 2.5 (adjusted for smoking and ethnic origin) was found to be associated with exposure to wood. There was increased risk for most histological types of epithelial tumour, except for transitional tumours. Of the 28 wood workers with nasal cancer, 16 had worked in the forestry industry, seven had been carpenters, four had been construction workers and one had been a cabinet-maker².

In a case-control study based on 167 cases of nasal or sinonasal cancer and 167 controls from Denmark, Finland and Sweden, exposure mainly to softwood dust (pine and spruce, but also some birch) was associated with epidermoid and anaplastic carcinomas, but not with adenocarcinomas. There were 13 cases with exposure only to softwood *versus* four controls (odds ratio, 3.3; 95% confidence interval, 1.1-9.4). Of these, four cases (all with epidermoid carcinoma) and two controls had been sawmill workers. Only two of the four cases had had potential exposure to chlorophenols (see p. 154)³.

In a Norwegian study based on 70 cases of various forms of sinonasal cancer (4 observed, 0.4 expected in saw- and planingmill workers; 3 observed, 1.8 expected in forestry workers),

three cases of non-Hodgkin's lymphoma were associated with employment in saw- and planingmill firms. The comparison was made between the number of cases observed in different occupations and the expected number of cases according to the 1946 census data of workers in these occupations⁴.

A case-control study of Hodgkin's disease⁵, using death certificates from North Carolina, USA, counties with a 'significant proportion' of the population employed in the furniture industry and in lumbering, showed an excess risk only among occupational groups with exposure to wood or paper. Carpenters and lumberers had a relative risk of 4.2 for Hodgkin's disease (95% confidence interval, 1.4-12.5). In Oregon, USA, a case-control study on leukaemia (ICD-9 codes 204-208)⁶ showed a three-fold increase in risk for patients who had worked for ten years or more in the sawmill industry ($p = 0.017$), based on nine exposed cases.

In a proportionate mortality study of the causes of death of 375 union-affiliated Swedish lumberjacks who had died between 1968 and 1977, there were fewer deaths from cancer than expected (PMR, 88; 69-111). A marked deficiency of deaths from lung cancer (SMR, 33) and excesses of deaths from kidney cancer (SMR, 193; 92-407) and from cancers of the lymphatic and haematopoietic systems (SMR, 191; 105-349) were found. No information was given about the histology of these two groups of tumours. The mortality experience of Swedish males during that period was used as the standard for comparison⁷.

A cohort study comparing the mortality experience of 10 322 men employed in wood-working industries with that of 406 798 non-wood workers showed no excess risk for all cancers combined. In the subcohort of lumber and sawmill workers, there was no statistically significant increase in the incidence of cancer at any site. No case of nasal cancer was reported⁸.

A nested case-control study⁹, based on an average of 25 years' follow-up of 3805 men working in the Finnish particle-board, plywood, sawmill or formaldehyde glue industries between 1944 and 1965, showed no clear connection between respiratory cancer incidence and most of the exposures studied, although some odds ratios were statistically significantly increased. For example, exposure to pesticides (in wood dust) and phenol was associated with elevated odds ratios, which became more marked among workers with more than ten years' exposure to pesticides. The raised odds ratios for exposure to phenol were partly explained by smoking and exposure to pesticides. Because of the mixed exposure, no single pesticide could be linked with respiratory cancer. Exposure to terpenes and other products of coniferous wood was also significantly associated with respiratory cancer when the duration of exposure exceeded five years. None of the odds ratios for exposure to wood dust and chlorophenols was statistically significant.

A proportionate mortality study showed an elevated risk for death from all cancers (PMR, 112; $p < 0.01$), stomach cancer (PMR, 128; $p < 0.01$) and non-Hodgkin's lymphoma (PMR, 139; $p < 0.05$) among woodworkers (including carpenters, cabinet-makers and furniture workers, lumber graders and scalers, sawyers in sawmills and woodworkers not classified elsewhere). In this mixed category, there was no death from sinonasal cancer¹⁰.

The epidemiological data reported here and previously¹ are not sufficient to make a definite assessment of the carcinogenic risks of employment in the lumber and sawmill

industries. It should also be noted that these two industries differ greatly with regard to exposures other than wood dust. Some studies suggest that the incidences of nasal cancers, lung cancer and Hodgkin's and non-Hodgkin's lymphoma may be increased. The patterns are not consistent, the results are based on few cases, and, in some studies, work in furniture manufacture has not been excluded sufficiently well. The hypothesis of a link with Hodgkin's disease is not adequately supported. Soft-tissue sarcomas and histiocytic lymphomas have been reported following exposure to chlorophenols and phenoxyacetic acid herbicides (see pp. 154 and 156), but the risk to sawmill and lumber workers was not quantified directly. Stomach cancer incidence was slightly elevated in these occupational groups in six mortality series; however, this might be related to nonoccupational factors.

References

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