

GENERAL REMARKS

This sixty-second volume of *IARC Monographs* addresses wood dust and formaldehyde. Wood dust has not been evaluated before in the *Monographs*; however, a previous working group, which met in June 1980, prepared a series of monographs (IARC, 1981) on industries and occupations in which exposure to wood dust can occur: the lumber and sawmill industry (including logging), the furniture and cabinet-making industry, carpentry and joinery and the pulp and paper industry. The information was updated during the preparation of Supplement 7 to the *Monographs* (IARC, 1987), and it was concluded that furniture and cabinet-making entail exposures that are carcinogenic to humans (Group 1), and carpentry and joinery entail exposures that are possibly carcinogenic to humans (Group 2B); exposures in the lumber and sawmill industries and the pulp and paper industries could not be classified as to their carcinogenicity to humans (Group 3). Formaldehyde has been considered previously in the *IARC Monographs* series; a monograph was first prepared in 1981 (IARC, 1982), and the epidemiological and experimental data were updated during preparation of Supplement 7 (IARC, 1987), when it was concluded that formaldehyde is probably carcinogenic to humans (Group 2A).

The present volume of *Monographs* addresses wood dust rather than wood industries. Few epidemiological studies are available to characterize the carcinogenic risks of specific concentrations or types of wood dust. Most of the available evidence comes from case series and case-control studies of cancer of the nasal cavities and paranasal sinuses among workers in various types of employment. It was difficult to obtain direct measurements of exposure or to characterize the concentration or type of wood dust or types of additives; in addition, no account could be taken of changes in the work environment over time. No studies were found on nonoccupational exposure to wood dust. Some industries and occupations not previously evaluated that are described in the present monograph on wood dust include plywood and particle-board manufacture and pattern and model making. Exposures in the pulp and paper industry were not included.

Progress in the understanding of the carcinogenesis of wood dust would be greatly facilitated by additional studies in experimental animals; in particular, an experimental model should be developed. Although the Working Group was aware of on-going experiments on the carcinogenicity of oak dust, with and without various additives, sustained support of such studies would be valuable, ideally at two or more research laboratories. These studies are needed in order to test various hypotheses about the mechanism of carcinogenicity of wood dust. The results of such studies could be used to generate hypotheses for further epidemiological studies of human carcinogenesis.

A number of occupational situations that involve exposure to wood dust also entail exposure to formaldehyde, for instance in plywood and particle-board manufacture, during

furniture and cabinet-making and during parquet floor sanding and varnishing. Formaldehyde is a constituent of living tissue and in this and other contexts is widely distributed in the environment, often at low concentrations. As described in the monograph, it also has specific uses in the chemical industry and is widely used as a preservative for biological materials. Humans are therefore occupationally exposed to formaldehyde, and studies have been conducted to investigate a possible relationship between exposure to formaldehyde and cancer. Cancer has not been associated with exposure to formaldehyde in an environmental context, nor with the occurrence of formaldehyde as a constituent of living tissue.

Many studies are available of occupational exposure to formaldehyde (sometimes in known association with other chemicals or types of exposure). Evaluation of the epidemiological data on formaldehyde is particularly difficult, from the point of view of classification of tumour type and establishment of causation in relation to rare tumours.

Evidence that formaldehyde causes cancer in experimental animals provides an inference of carcinogenic hazard for humans. Extrapolation of the available experimental findings to humans should take into consideration all other relevant data (including possible levels of human exposure and data indicating mechanism of action). Although human tissue may be inherently susceptible to the carcinogenicity of formaldehyde, any such effect may require exposure to concentrations of the chemical that are so high that they would not be tolerated because of its pungent odour. The Working Group gave detailed consideration to this and all other matters impinging on an evaluation of the carcinogenicity of formaldehyde to humans.

References

- IARC (1981) *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans*, Vol. 25, *Wood, Leather and Some Associated Industries*, Lyon, pp. 49–157
- IARC (1982) *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans*, Vol. 29, *Some Industrial Chemicals and Dyestuffs*, Lyon, pp. 345–389
- IARC (1987) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Suppl. 7, *Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1 to 42*, Lyon, pp. 211–216, 378–387