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International Agency for Research on Cancer

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IARC CLASSIFIES FORMALDEHYDE AS CARCINOGENIC TO HUMANS

"Twenty-six scientists from 10 countries evaluated the available evidence on the carcinogenicity of formaldehyde, a widely used chemical", reports Dr Peter Boyle, Director of the International Agency for Research on Cancer (IARC), part of the World Health Organization. The working group, convened by the *IARC Monographs Programme*, concluded that formaldehyde is *carcinogenic to humans*. Previous evaluations, based on the smaller number of studies available at that time, had concluded that formaldehyde was *probably carcinogenic to humans*, but new information from studies of persons exposed to formaldehyde has increased the overall weight of the evidence.

Based on this new information, the expert working group has determined that there is now *sufficient evidence* that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries. "Their conclusion that there is adequate data available from humans for an increased risk of a relatively rare form of cancer (nasopharyngeal cancer), and a supporting mechanism, demonstrates the value and strengths of the Monographs Programme," emphasized Dr Boyle. The working group also found *limited evidence* for cancer of the nasal cavity and paranasal sinuses and "strong but *not sufficient evidence*" for leukaemia. The finding for leukaemia reflects the epidemiologists' finding of strong evidence in human studies coupled with an inability to identify a mechanism for induction of leukaemia, based on the data available at this time. "By signalling the degree of evidence for leukaemia and cancer of the nasal cavity and paranasal sinuses, the working group identified areas where further clarification through research is needed. This represents a service to Public Health", Dr Boyle concluded.

Formaldehyde is produced worldwide on a large scale. It is used mainly in the production of resins that are used as adhesives and binders for wood products, pulp, paper, glasswool and rockwool. Formaldehyde is also used extensively in the production of plastics and coatings, in textile finishing and in the manufacture of industrial chemicals. It is used as a disinfectant and preservative (formalin) in many applications.

Common sources of exposure include vehicle emissions, particle boards and similar building materials, carpets, paints and varnishes, foods and cooking, tobacco smoke, and the use of formaldehyde as a disinfectant. Levels of formaldehyde in outdoor air are generally low but higher levels can be found in the indoor air of homes.

Occupational exposure to formaldehyde occurs in a wide variety of occupations and industries: for example, it is estimated that more than one million workers are exposed to some degree across the European Union. Short-term exposures to high levels have been reported for embalmers, pathologists and paper workers. Lower levels have usually been encountered during the manufacture of man-made vitreous fibres, abrasives and rubber and in formaldehyde production industries. A very wide range of exposure levels has been observed in the production of resins and plastic products. The development of resins that release less formaldehyde and improved ventilation has resulted in decreased exposure levels in many industrial settings in recent decades.

The working group also evaluated two glycol ethers (2-butoxyethanol and 1-*tert*-butoxy-2-propanol) and evaluated these as *not classifiable as to their carcinogenicity to humans*, due to the inadequate level of evidence in humans and limited evidence in experimental animals available to the experts. Further research is needed on these widely-used solvents.

The IARC Monographs

The IARC Monographs series publishes authoritative independent assessments by international experts of the carcinogenic risks posed to humans by a variety of agents, mixtures and exposures. Since its inception in 1972, the series has reviewed more than 880 agents, and IARC Monographs have become well-known for their thoroughness, accuracy and integrity. <http://monographs.iarc.fr/>. For details about evaluation criteria, please link to <http://monographs.iarc.fr/monoeval/eval.html>.

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