

International Agency for Research on Cancer



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IARC Monographs Volume 112: evaluation of five organophosphate insecticides and herbicides

Lyon, France, 20 March 2015 – The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, **has assessed the carcinogenicity of five organophosphate pesticides.** A summary of the final evaluations together with a short rationale have now been published online in *The Lancet Oncology*, and the detailed assessments will be published as Volume 112 of the IARC Monographs.

What were the results of the IARC evaluations?

The herbicide **glyphosate** and the insecticides **malathion** and **diazinon** **were classified as probably carcinogenic to humans (Group 2A).**

The insecticides **tetrachlorvinphos** and **parathion** were classified as *possibly carcinogenic to humans* (Group 2B).

What was the scientific basis of the IARC evaluations?

For the herbicide **glyphosate**, there was *limited evidence of carcinogenicity* in humans for **non-Hodgkin lymphoma**. The evidence in humans is from **studies of exposures, mostly agricultural, in the USA, Canada, and Sweden published since 2001.** In addition, there is convincing **evidence that glyphosate also can cause cancer in laboratory animals.** The IARC Working Group that conducted the evaluation considered the significant findings from the US EPA report and several more recent positive results in concluding that there **is sufficient evidence of carcinogenicity in experimental animals.** **Glyphosate also caused DNA and chromosomal damage in human cells,** although it gave negative results in tests using bacteria. One study in community residents reported increases in blood markers of chromosomal damage (micronuclei) after glyphosate formulations were sprayed nearby.

How are people exposed to these pesticides?

Glyphosate currently has the highest global production volume of all herbicides. The largest use worldwide is in agriculture. The agricultural use of glyphosate has increased sharply since the development of crops that have been genetically modified to make them resistant to glyphosate. Glyphosate is also used in forestry, urban, and home applications. **Glyphosate has been detected in the air during spraying, in water, and in food.** The general population is exposed primarily through residence near sprayed areas, home use, and diet, and the level that has been observed is generally low.

What are the implications of the IARC evaluations?

The Monographs Programme **provides scientific evaluations** based on a comprehensive review of the scientific literature, but **it remains the responsibility of individual governments and other international organizations to recommend regulations, legislation, or public health intervention.**

Media inquiries: please write to com@iarc.fr. Thank you.