

PESTICIDES AND CANCER



Some pesticides are known or suspected to be human carcinogens and are carcinogenic in animal bioassays.¹ EPA now classifies nearly 100 pesticides as either likely or probable human carcinogens, and over 75 as possible human carcinogens.² As of 1990, 24 of 51 pesticides evaluated by the U.S. National Cancer Institute and the U.S. National Toxicology Program demonstrated carcinogenicity in chronic bioassays.³

Certain pesticides may cause or promote cancer in several ways, such as: 1) genotoxic effects that change DNA; 2) promotion, which causes fixation and the proliferation of abnormal clones; 3) hormone disruption; and, 4) immunotoxic effects, which affect the body's normal cancer surveillance mechanisms. Even small doses of a genotoxic chemical can initiate the conversion of a normal cell to a malignant one.

- ❖ An estimated 80-90% of all non-hereditary cancer in humans is caused by exposure to carcinogens found in the environment, including tobacco, ethanol, and micronutrients.⁴
- ❖ Studies have reported that children who live in homes with home and garden pesticide use are 3 to 6 times more likely to develop leukemia than other children.⁵
- ❖ Certain pesticides act as “environmental estrogens” and “endocrine disruptors” even at low-dose exposures, and are probable human carcinogens.⁶

The correlation between cancer and pesticide exposure is evident in cell culture studies that demonstrate chromosomal damage or estrogenicity, human epidemiological studies, and laboratory animal studies.⁷ The table on the back of this page summarizes the human epidemiological evidence that pesticides may cause or promote cancer. Although certain groups such as agricultural workers, gardeners, and pest control applicators may be at highest risk, non-occupational exposures regularly occur in the workplace and in communities and homes.



Pesticides may also be associated with other cancers not listed in the table on the back of this page. Unfortunately, the state of knowledge is deficient because of the difficulty in measuring pesticide exposures years after the damage may have been done. Until pesticides have been proven safe for children and adults, it only makes sense to minimize exposure to the greatest extent possible.

Type of Cancer	Pesticides Implicated as Causing or Promoting Cancer
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Hematological Malignancies in Adults

Non-Hodgkins Lymphoma	Phenoxy herbicides, dichlorophenoxyacetic acid (2,4-D), lindane (used for lice treatment), organophosphates, carbaryl, chlordane, DDT, diazinon, dichlorvos, malathion, nicotine, toxaphene, and some fungicides.
Soft Tissue Sarcomas	Phenoxy herbicides, chlorophenols with dioxin contaminants, and dioxins.

Carcinomas and Central Nervous System Malignancies in Adults

Brain Tumors	No studies yet connect specific pesticides to brain tumors. However, occupational groups exposed to pesticides have an increased rate of brain tumors.
Lung Cancer	Phenoxy herbicides, chlorophenols with dioxin contaminants, and dioxin.
Prostate Cancer	No studies yet connect specific pesticides to prostate cancer. However, occupational groups exposed to pesticides have an increased rate of prostate cancer.

Childhood Malignancies

Childhood Leukemia	Parental and childhood residence in homes with home and garden pesticide use. Parents in pesticide-using occupations during pregnancy.
Brain and Nervous System Tumors	Home use of pesticides for flea and/or tick pet-treatments, pest strips, termite-control, lindane shampoo, yard and orchard herbicides, home pesticide bombs, and carbaryl for outdoor use during gestation and childhood, and occupation during pregnancy.

Source: Solomon, Gina (2000). "Pesticides and Human Health: A Resource for Health Care Professionals." Published by Physicians for Social Responsibility and Californians for Pesticide Reform. Available online at <http://www.sfbaypsr.org/publications.html>.

- 1 Zahm, Shelia Hoar and Mary H. Ward (1998). "Pesticides and Childhood Cancer." *Environmental Health Perspectives* 106, Supplement 3, June.
- 2 U.S. Environmental Protection Agency (2002). "Chemicals Evaluated for Carcinogenic Potential." Science Information Management Branch, Health Effects Division. Office of Pesticide Programs. August.
- 3 See note 1 above.
- 4 Landigran, Phil and Herbert Needleman (1996). "Raising Children Toxic Free: How to Keep Your Child Safe from Lead Asbestos, Pesticides, and Other Environmental Hazards." Farrar Straus & Giroux.
- 5 Lowengart RA, Peters JM, Cicioni C, Buckley J, Bernstein L, Preston-Martin S, Rappaport E. (1987). "Childhood leukemia and parents' occupation and home exposures." *J Natl Cancer Inst* 79:39-46.
- 6 Colborn, Theo et.al. (1996). "Our Stolen Future." Dutton.
- 7 Solomon, Gina (2000). "Pesticides and Human Health: A Resource for Health Care Professionals." Published by Physicians for Social Responsibility and Californians for Pesticide Reform. Available online at <http://www.sfbaypsr.org/publications.html>.

MARYLAND PESTICIDE NETWORK

www.mdpestnet.org • info@mdpestnet.org • (410) 849-3909