



What is the Connection between Pesticides and Breast Cancer?

A growing body of scientific evidence suggests that exposures to toxic chemicals, including pesticides, in the environment are contributing to high breast cancer rates. Pesticides used in and around the home and in agriculture are used to control pests like weeds (herbicides), fungus (fungicides), insects including fleas and ticks on pets (insecticides) and rodents (rodenticides).

Pesticides are just one of many daily toxic exposures. We can be exposed to unsafe chemicals through the use of pesticides in our yards, on our pets, in public parks or on the food we eat as well as from certain plastics, cosmetics and pharmaceuticals.

Even though some pesticides have been banned, they remain in the body and the environment for decades. DDT, perhaps the most studied pesticide, was banned in the U.S. in 1973 but can still be found in household dust samples and in the body fat of humans and animals and in human breast milk and placenta.

Not all pesticides linked to breast cancer act the same.

Some pesticides are breast carcinogens. Carcinogenic chemicals are found widely in our environment and cause direct damage to breast cell DNA or change the cell's ability to respond to internal or external challenges. Ten of the 216 animal mammary carcinogens listed by Silent Spring Institute in 2007 are pesticides.

Other pesticides disrupt hormones in the body. Many pesticides are endocrine disruptors. Endocrine disruptors are chemicals that disturb or mimic normal biological processes like the actions of hormones including androgens, estrogens and thyroid hormone. Chemicals that mimic estrogen are of particular concern because exposure over time to natural estrogen—or synthetic chemicals that act like estrogen—increases the risk of breast cancer.

See table on back for a list of pesticides linked to breast cancer, whether they are carcinogens or endocrine disruptors and common sources of exposure.

What can we do about pesticides?

Support organic agriculture at home and in the schools to reduce exposure to hormonally-active pesticide residues and find alternatives to pesticide use in your daily life. Visit www.panna.org for more information.

Support bans of the cosmetic – purely aesthetic – use of pesticides, meaning, where the weed or pest poses no danger to human health, the environment or property. The cities of San Francisco and Oakland in California have banned the use of pesticides in their parks for years and Canadians are actively pushing for bans in municipalities. What about your town?

Pesticides may disrupt the endocrine systems of children during critical stages of development and contribute to later-life breast cancer risk or to the early onset of puberty, also a risk factor for breast cancer. Visit www.breastcancerfund.org/pubertyreport to learn more.

* Silent Spring Institute's Science Review published in *Cancer* in 2007 includes information on 216 animal mammary gland carcinogens. www.sciencereview.silentspring.org

† International Agency for Research on Cancer (IARC) carcinogenic risk classification is based on evaluation of potential tumor development at all sites, not only breast/mammary tissue. Categories include: Known, Probable, Possible and others. The National Toxicology Program (NTP), within the National Institute of Environmental Health Sciences of the National Institutes of Health, provides carcinogenicity ratings based on scientific evidence in both animals and humans. Categories include: Known, Reasonably Anticipated, and others. (Report on Carcinogens, Eleventh Edition; U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program.) Not all chemicals have been rated by IARC or NTP.

‡ To date, neither the NTP nor IARC have classified most endocrine disruptors as carcinogens in humans. List of endocrine disruptors from: Brody JG, Rudel RA (2003). Environmental pollutants and breast cancer. *Environmental Health Perspectives* 111: 1007-1019.

Pesticide	Carcinogenic		Disrupt Hormones	Source of exposure/scope of use
	Animal Mammary Gland Carcinogen *	Human Carcinogenic Risk Classification †	Disrupts Endocrine System/ Estrogenic ‡	
1,2-Dibromo-3-chloropropane	√	IARC Possible; NTP Reasonably anticipated		Pesticide, air pollutant, ingestion of previously contaminated food and water, banned as soil fumigant in 1985
2,4-Dichlorophenoxyacetic acid			√	Pesticide: herbicide
Atrazine (a Triazine herbicide)	√	IARC Not Classifiable	√	Pesticide: herbicide, air pollutant, found widely in water bodies, exposure through ingestion of food or water, banned in European Union in 2005, 75 million pounds used annually in U.S. mainly on corn and sorghum
Captafol	√	IARC Probable		Pesticide: fungicide, not currently registered for use in U.S.
Chlordane	√		√	Pesticide: insecticide (ticks and mites), veterinary pharmaceutical, air pollutant, use as insecticide has been banned, persists in meat, fish, and found in household dust
Chlorpyrifos			√	Pesticide: insecticide (ticks and mites)
Clonitralid	√			Pesticide, exposure through dermal contact or ingestion of water treated with clonitralid (for water snail and sea lamprey control) or contaminated fish
Cypermethrin			√	Pesticide: insecticide
DDT (Dichloro-diphenyl-trichloroethane)		NTP Reasonably anticipated	√	Pesticide: contact insecticide, banned in many countries, used for malaria control in others, DDT and metabolite DDE still found in body fat of humans and animals though banned in U.S. in 1973
Dichlorvos	√	IARC Possible		Pesticide, air pollutant, inhalation or air and dermal contact with no-pest strips, sprays or flea collars, ingestion of food prepared where dichlorvos has been used
Dieldrin, Aldrin, Endrin (-drin pesticides)			√	Pesticide: insecticide, 1950s to 1970s dieldrin and aldrin used on corn and cotton, 1987 both were banned, still persist in environment
Fenvalerate	√	IARC Not Classifiable		Pesticide, landscaping/yard products, pet care products
Heptachlor		IARC Possible	√	Pesticide: insecticide, used for termite control through 1980s in U.S., agricultural use continued until 1993 (especially on pineapple), affects liver's processing of estrogen
Lindane		NTP Reasonably anticipated	√	Pesticide: insecticide
Malathion			√	Pesticide: insecticide
Methoxychlor			√	Pesticide: insecticide, veterinary pharmaceutical
Nifurthiazole	√	IARC Possible		Pesticide
Pentachlorophenol			√	Pesticide: insecticide (termites), wood preservative
Permethrin, Sumithrin			√	Pesticide: insecticide
Simazine (a Triazine herbicide)	√	IARC Not Classifiable		Pesticide, air pollutant, widely used to control weeds in food crops and in ponds, algae control in pools and fountains, detected at low levels in air, rainwater and surface water
Sulfallate	√	IARC Possible; NTP Reasonably anticipated		Pesticide: herbicide, used until early 1990s in U.S., exposure through ingestion of residues in food crops
Toxaphene		NTP Reasonably anticipated	√	Pesticide: insecticide
Tributyl Tin (chloride)			√	Pesticide: biocide, rodent repellent
Vinclozolin			√	Pesticide: agricultural fungicide, used in vineyards