# What is the Connection between Plastic and Breast Cancer?

A growing body of scientific evidence suggests that exposures to toxic chemicals in the environment are contributing to high breast cancer rates. Some toxic chemicals are found in the plastics that we use in our everyday lives.

Plastics are widely used in consumer products and packaging of all kinds. There are, however, serious risks to human health and the environment from the widespread use of plastics. Most plastics are made from petroleum, a non-renewable resource. Not all plastic is recycled and millions of bottles go to landfills and waterways every year where they will continue to leach chemicals into the environment for many generations.

**Not all toxic chemicals linked to breast cancer act the same.**

***Some chemicals formed in the manufacturing of plastic 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. For example, vinyl chloride and dioxin, both carcinogens, are released through the production of polyvinyl chloride (PVC) plastic.

***Other chemicals can leach from plastic and disrupt hormones in the body.*** These chemicals, called endocrine disruptors, 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. Some plastics leach toxic chemicals when heated, put under pressure or as they age. Bisphenol A leaches from polycarbonate plastic, styrene can leach form polystyrene plastic, and phthalates leach from PVC plastic. Bisphenol A and phthalates are endocrine disruptors and styrene is an animal mammary carcinogen.

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

**What can we do about toxic chemicals in plastics?**

Use less plastic. Carry a reusable water bottle with you, invest in stainless steal, glass or ceramic food storage containers, opt for a paper towel or wax paper instead of plastic wraps and baggies, and bring your own bags to the grocery store.

Join BCF in advocating for laws that protect people from toxic chemicals in plastics and pushing for the development of safer alternatives. Support legislation on the state level like the California Toxic Toys bill of 2007 that reduces children's exposures to endocrine disrupting chemicals like Bisphenol A and phthalates in products specifically marketed to young children. Visit the BCF's Legislative Toolkit to learn more and see how to get involved in your state: www.breastcancerfund.org/toolkit

Endocrine disruptors like Bisphenol A and phthalates that can leach from plastics are of particular concern for children and may play a role in early puberty. Early puberty, in turn, is a risk factor for breast cancer later in life. Minimize children's exposures to plastic toys, bottles, and "sippy" cups and look for safe alternatives. For more information: www.enviornmentcalifornia.org and www.healthychild.org. To learn more about the falling age of puberty in U.S. girls visit: www.breastcancerfund.org/pubertyreport.

| Plastic | Breast Cancer Fund Rating | Link to Breast Cancer | | Explanation | Where plastic is found in consumer products |
|---|---|---|---|---|---|
| | | Carcinogen by-product of manufacturing [i] [ii] | Hormone Disruptors can leach out [iii] | | |
| **#1 PET PETE** Polyethylene terephthalate ethylene | Okay | | | | Soft drink, juice, water, detergent, cleaners |
| **#2 HDPE** High density polyethylene | Okay | | | | Opaque plastic milk and water jugs, bleach, detergent and shampoo bottles, some plastic bags |
| **#3 PVC** Polyvinyl chloride | Avoid | √ | √ | Vinyl chloride and dioxin, both known human carcinogens (NTP and IARC), are formed in manufacturing; dioxin is also a hormone disruptor; hormone disrupting phthalates can leach out of PVC | Cling wrap, some plastic squeeze bottles, cooking oil, detergent, window cleaner bottles, toys, vinyl shower curtains, wall and floor coverings |
| **#4 LDPE** Low density polyethylene | Okay | | | | Grocery store bags, most plastic wraps, some bottles |
| **#5 PP** Polypropylene | Okay | | | | Used in most Rubbermaid, syrup and yogurt containers, straws and other clouded plastic containers, some baby bottles |
| **#6 PS** Polystyrene | Avoid | √ | | Styrene can leach from polystyrene, is an animal mammary carcinogen and is possibly carcinogenic to humans (IARC) | Styrofoam food trays, egg cartons, disposable cups and bowls, carryout containers, opaque plastic cutlery |
| **#7 Other** Usually Polycarbonate | Avoid | | √ | Hormone disrupting Bisphenol A can leach from polycarbonate under heat and pressure or as plastic ages | Most plastic baby bottles, 5-gallon water bottles, "sport" water bottles, metal food can liners, clear plastic "sippy" cups, dental sealants, some clear plastic cutlery |

Note: Portions of table above based on Smart Plastics Guide: Healthier Food Uses of Plastics, Institute for Agriculture and Trade Policy, www.iatp.org/foodandhealth

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

[ii] 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.

[iii] 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.