

Breast Cancer and the Environment: Science News from Silent Spring Institute May 2005

Pollution Hits Home

In 1987, Dr. Ana Soto at Tufts University faced a perplexing problem. She was studying how exposure to estradiol – a natural estrogen – makes estrogen-sensitive human breast cancer cells grow. But, unexpectedly, the unexposed control cells in her lab began to proliferate! It took years to figure out that new plastic test tubes in her laboratory were to blame. The tubes were leaching nonylphenol, a synthetic chemical found in many common products, such as detergents, plastics and pesticides.

With this discovery, Dr. Soto began a new area of research that has led her laboratory and others to identify more than 150 chemicals that mimic estrogen, block androgen, or otherwise affect hormones. These chemicals are known as endocrine disrupting compounds (EDCs). They are found in building materials, furniture, and everyday products – detergents, pesticides, plastics, cosmetics – and in air and water pollution.

Given that natural estrogen and pharmaceutical estrogens, such as HRT, increase breast cancer risk, it makes sense to target estrogen mimics and other EDCs in breast cancer research. If we find links between these chemicals and breast cancer, we will be a big step closer to breast cancer prevention.

In order to study the links between chemicals and breast cancer, we need to first measure and understand how women are exposed. Because many of the EDCs are in consumer products and because all of us, and especially women, spend a lot of time at home, Silent Spring Institute decided to tackle EDCs in a study of exposures in homes.

We tested for 89 EDCs in air and dust in 120 homes on Cape Cod, where we have been studying possible environmental links to breast cancer for the last ten years. Results were published in the scientific journal *Environmental Science and Technology*, which called the study “the most comprehensive assessment to date” of pollutants in homes. For 30 of the chemicals we tested, ours are the first measurements ever reported from indoor environments.

- We found 67 target compounds in all, with an average of about 20 per home. That’s a reminder that when we think about effects of chemicals on health, we have to take into account multiple exposures rather than the one-at-a-time approach that is currently used for chemicals regulation.
- The study showed that chemicals break down very slowly indoors. We found DDT, which was banned more than 30 years ago, in about two thirds of the homes. As toxicologist Ruthann Rudel says, “Think about what your furniture would look like if you left it out on the street for thirty years. Now think about it in your living room. Protected from sun, rain, and wind, materials stay pretty much in tact.” The lesson here is that we need to be more careful about testing chemicals before we put them into use, because banning them later won’t get them out of our homes.
- The most abundant pollutants were phthalates (from plastics and personal care products, such as nail polish and hair spray) and certain phenols from disinfectants, detergents, and adhesives, for example in furnishings.
- We found phthalates in every home. Researchers have found phthalates are associated with androgen-blocking effects in males, including lowered sperm count and certain hormonal birth defects. Their effects on girls and women have not been investigated much yet. Many breast cancer activists have joined the recent effort to remove phthalates from

cosmetics, as the Europeans are doing; and 116 cosmetics manufacturers have agreed. (Go to www.safecosmetics.org to learn more.)

- We found 27 different pesticides in all.
- We found the flame retardant PBDE's at ten times the levels reported in Europe, where these chemicals are not used as much.

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For more scientific detail, please visit the Silent Spring Institute web site resources on household exposure: <http://library.silentspring.org/news/hesresults.asp>.