SILENT SPRING INSTITUTE

RESEARCHING THE ENVIRONMENT AND WOMEN'S HEALTH

29 Crafts Street, Newton, MA 02458 617 332 4288 fax 617 332 4284
115 Enterprise Road, Hyannis, MA 02601 508 778 1942
email info@silentspring.org www.silentspring.org

Household Exposure to Environmental Pollutants Targeted in Breast Cancer Study

Questions and Answers

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What was the purpose of the original study and who are its participants?

The Household Exposure Study was designed to learn about exposure to endocrine disrupting compounds (EDCs) – chemicals that can mimic or interfere with hormones – and mammary carcinogens. We tested 120 homes for 89 chemicals. These chemicals are commonly found in household products such as some pesticides, detergents, plastics, furniture, building materials, and cosmetics. This is the most comprehensive study to date of EDCs in homes. For 30 of the target chemicals, ours are the first measurements reported from indoor environments.

The homes were selected from the 2100 women who participated in the Cape Cod Breast Cancer and Environment Study. Half of the women in the larger study were chosen because they were diagnosed with breast cancer in 1988-1995; the other half were a comparison group comparable in age. Homes were tested in 1999-2001.

We found 67 total chemicals in all of the homes with an average of 26 per home. We found 27 different pesticides, including DDT, even though it was banned in 1972. Chemicals from plastics, detergents, and personal care products were the most abundant. For a fact sheet about results, go to http://library.silentspring.org/publications/pdfs/EST_2003_article_summary.pdf. Results were published in the October 2003 issue of the peer-reviewed journal *Environmental Science & Technology*.

Why are you retesting some of those homes?

Silent Spring Institute and Massachusetts Department of Public Health (MDPH) selected for retesting those homes that had unusually high levels of a contaminant that exceeded a federal health guideline or homes with higher-than-expected levels of a contaminant for which the federal government has not set a health guideline. All of the homes that contained 2,3-dibromo-1-propanol, a breakdown product the flame retardant tris (2,3-dibromopropyl) phosphate, were selected for retesting, because this chemical is a potent carcinogen that was banned in the 1970s. With further testing, we hope to determine where and why it is still present in some homes, so residents can remove the source of the pollutant.

Did you find higher levels of chemicals in any particular cluster of homes?

We are still analyzing data to identify factors that may be shared among homes that had elevated levels of similar chemicals. We will make this information public when the data analysis is complete.

Will the retesting be repeat the same tests or is it a different type of testing?

We will repeat the initial testing and collect some additional samples that may help us locate potential sources. We will offer re-testing within 2-8 weeks of sending women their initial results. Results will be available about 12 weeks after the retesting.

Would my health be at risk if I stayed in a home with the higher levels of chemicals while I was waiting for it to be retested?

We don't know what kind of health risk is associated with the levels of chemicals we found. Re-testing won't lower the risk, but it will tell us whether the levels are consistent over time. Reducing exposure is one precaution to reduce risk – we are conducting research to help identify sources of these compounds so that they can be removed. We also sent women in the study a table showing the information we have now about sources of the target chemicals, so people can identify ways to reduce the use of products that are likely sources.

I wasn't selected for retesting. Does this mean my home is safe?

Because testing and retesting is expensive, we limited our retests to those homes most at risk. Testing costs about $5,000 per home.

Women in the study can refer to the results for their own home to see how it ranks compared with other homes and with federal health guidelines. The results sent to each woman show the federal health guidelines for comparison (though federal guidelines have not yet been developed for all the chemicals) and how each home ranks in comparison with others in the study.

The chemicals in the study were identified because they are endocrine disruptors or mammary carcinogens, so many people will want to reduce exposures as a precaution.

The testing and retesting is designed to help us develop guidelines to reduce contamination in any home -- not just the homes we are testing -- so even if your home wasn't chosen for retesting, we hope to provide you additional information from our future research. In the future, we may ask for volunteers to have their homes retested.

Why spend money on this research when no one knows the relationship between these contaminant levels and breast cancer?

Understanding exposure is a critical first step toward evaluating health effects, including breast cancer risk. The Massachusetts Breast Cancer Coalition founded Silent Spring Institute specifically to do this kind of research, because most breast cancer studies are focused on diagnosis and treatment and not placing an emphasis on science that can lead to prevention.

The science needed to make a link between chemical pollutants and breast cancer is complex. This study answers questions about which chemical exposures are most common, which chemicals are found at the highest concentrations, and whether women are likely exposed by breathing or ingestion. Scientists have to be able to answer these questions about exposure before we can make the link from exposure to breast cancer or other health effects. This study also gives us information we can use now to reduce exposures as a precaution.

How safe is it for me/my family/kids/grandkids to be around these chemicals?

Researchers haven't resolved the questions of what level of exposure to certain chemicals is safe, or how these chemicals work in combination to affect our health. Many of the chemicals have caused health problems in animal studies, and for some, there is evidence of health harm to humans. Air and dust are sources of everyday exposure. We are also exposed from water and food.

Based on what is currently known, many people decide to take steps to reduce the levels of these potentially harmful chemicals in homes by reducing chemical use and encouraging manufacturers and government officials to take steps to reduce exposure and test chemicals more thoroughly.

The levels of chemicals found in my home seem too low to cause me any harm. I have heard that there's no link between low exposures to these chemicals and cancer.

You may hear different assessments from different sources, because there isn't enough evidence yet for scientists to agree on whether some of these chemicals at low levels are linked to disease. For about 30 of the chemicals in this study, the Silent Spring Institute measurements are the first ever reported from indoor environments. For 28 of the chemicals, there is no health-based federal guideline for evaluating health risk associated with exposures.

When you hear "there is no evidence of harm" from these chemicals, it is often the case that there is no evidence because no one has studied the health effects yet. Sometimes there is strong evidence from animal studies, but none from tests with humans as it is unethical to test toxic chemicals on people.

Also, keep in mind that we don't know very much about the cumulative effects of multiple chemicals since most are tested alone. That's important because people are exposed to chemicals in combinations, not individually. We found 26 target chemicals per home, on average.

We selected these chemicals for testing based on laboratory studies that show they can affect the hormone system or cause mammary tumors in animals. Many of them mimic estrogen, resulting in the growth of human breast cancer cells in laboratory studies. Scientists have not yet investigated a link between most of these chemicals and breast cancer in women, and the few previous studies have yielded conflicting results. But, given that we do know that natural estrogen and pharmaceutical hormones, like hormone replacement therapy (HRT), cause breast cancer, the hypothesis that estrogen mimics from other sources increase breast cancer risk is strong enough that many of us would want to reduce exposure as a precaution.

Finally, there are lab studies that show low levels of exposure to some of these chemicals cause health effects other than cancer, such as reproductive disorders, learning disabilities and immune system disorders. Again, the science isn't yet complete, but until we know more we can limit exposure to toxic chemicals as a wise strategy to reduce risk.

Are these findings just relevant for Cape Cod? Is Cape Cod more contaminated than other areas?

This research is important and relevant to women and families everywhere, not just on Cape Cod. The chemicals we tested for come from common products and are also in air pollution, so we would expect to find them across the US.

The results of our study were significant enough to be reported in the *Los Angeles Times* and the *St. Louis Post Dispatch*, among others. The scientific journal that published the study results placed this as their cover story, indicating the scientific community considers this relevant internationally as well.

At the same time, some of the results do have particular significance for Cape Cod. For a few of the chemicals, we can compare Cape Cod results to other places. For the pesticides DDT, chlordane, carbaryl, methoxychlor, pentachlorophenol and propoxur, the levels found in Cape Cod homes were higher than in studies done in Long Island, Seattle, Detroit, Los Angeles, Iowa or Arizona. Cape Cod homes did not have the highest levels of chemicals such as PAH, PCBs, or the pesticides diazinon, chlorpyrifos and permethrin. These regional differences could be due to differences in product use or air pollution.
We are beginning new research that will compare Cape Cod homes with homes in Richmond, CA, and Pittsburgh, PA, so we can learn more about pollutant levels on Cape Cod that could be studied as a potential factor in higher breast cancer risk on the Cape.

How can I reduce the levels of chemicals in my home?

To reduce chemical levels in homes, choose less toxic alternatives when shopping for common household products. Research on indoor air pollution identifies some steps to reduce exposure:

- Reduce or eliminate pesticides.
- Avoid tracking pollutants into your home by placing a rug at each entry; remove outdoor shoes there.
- Improve indoor air quality by opening windows.
- Choose a vacuum cleaner that contains the dust from the floor, rather than spreading it. *Consumerreports.org* lists the best ones.
- Don't smoke indoors.
- Vent your gas stove, broiler, grill, or fireplace.
- Avoid using wood-burning fireplaces and stoves.
- Choose fuel-efficient vehicles, because auto exhaust contains mammary carcinogens.
- Choose fragrance-free cleaning products and cosmetics and try to avoid cosmetics and personal care products with phthalates and parabens. For details about which products contain these chemicals, go to http://www.safecosmetics.org/.
- Don't store gas-powered engines, gasoline, or solvents in your basement or an attached garage. If you must, open the space to the outdoor air, ventilate, and consider storing hazards in an airtight box.
- Use glues, paints, solvents, and fingernail polish outside or in a well-ventilated area.
- Shop for electronics and furniture that don't contain the flame retardant PBDEs.

We must all work together to get hazardous chemicals removed from consumer products, and to reduce air and water pollution. A good way to do this is to become involved with the MA Breast Cancer Coalition and the Alliance for a Healthy Tomorrow. These groups have programs underway to get manufacturers and governments to choose safer alternatives for ingredients in cleaning products, cosmetics, and other common products and to require more rigorous testing of health effects. Similar organizations exist in other regions of the country. To find one near you, go to www.cheforhealth.org.

You can find additional tips to make your home safer at http://www.epa.gov/iaq/pubs/insidest.html, http://www.checnet.org/healthehouse/home/index.asp, http://toxtown.nlm.nih.gov and http://www.safecosmetics.org/.

As a breast cancer survivor very much interested in the research on the link between breast cancer and the environment, how can I help?

Women who participated in this study have made a great contribution to knowledge about household contaminants. Each of us can continue to contribute by letting elected officials, manufacturers, and our family and friends know how much we care about understanding and eliminating health effects from pollution. We can multiply our voices on these issues by working with the Massachusetts Breast Cancer Coalition and the Alliance for a Healthy Tomorrow to support the Safer Alternatives law.