

Our Perspective on the Institute of Medicine report *Breast Cancer and the Environment: A Life Course Approach*.

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Silent Spring Institute's perspective on the report's top take-home points related to environmental chemicals

The Institute of Medicine report on breast cancer and the environment is a clear statement to breast cancer doctors, many of them gathered in San Antonio where the report was released, that **a cascade of scientific evidence shows that environmental chemicals have biological activity that plausibly links them to breast cancer risk**. That's a significant step, because for years, medical experts have dismissed questions about environmental chemicals and breast cancer and ridiculed concerns about consumer products - from deodorants to plastics - as "myths," saying that there's no evidence that exposures cause breast cancer. The "no evidence" messages ignored studies by Silent Spring Institute and others that show hundreds of chemicals in consumer products and pollution cause breast tumors in animals, mimic estrogen (a known breast cancer risk factor), and stunt breast development. Now, the IOM recognizes that we must pay attention to this full range of research, including laboratory experimental studies, acknowledging that evidence from human studies is often not attainable.

- Acknowledging that definitive human evidence of breast cancer links is unattainable for many chemicals we are exposed to across a lifetime, the IOM **recommends better methods for experimental testing of chemicals specifically for effects relevant to breast cancer**. What's implied is that experimental studies that show a chemical might plausibly increase breast cancer risk are a reasonable basis for action to reduce exposure, since human data are difficult or impossible to obtain. In the context of U.S. breast cancer institutions focused on mammography and treatment, the recommendation for chemicals testing is a significant positive step for prevention. The President's Cancer Panel report on the environment was the first major statement that safety testing of consumer product chemicals should be part of the nation's cancer response, and this IOM report continues that discussion specifically for breast cancer. The President's Cancer Panel and IOM both extend Silent Spring's earlier analyses published in [Cancer](#) and [Environmental Health Perspectives](#).
- The report **recommends that we "limit or eliminate workplace, consumer, and environmental exposures to chemicals that are plausible contributors to breast cancer risk while considering risks of substitutes."** That sounds like common sense, but it represents a significant departure from the prevailing skepticism in the medical community about environmental chemicals and breast cancer prevention. Plausible contributors to breast cancer include chemicals that are mammary gland carcinogens in animals, affect hormones, or influence breast development during a critical exposure periods.
- The IOM concludes that **smoking increases breast cancer risk and passive smoke should be avoided**. Yes, we already know that smoking is bad, but acknowledging its relevance to breast

cancer adds weight to evidence about other environmental chemicals, including dozens in tobacco smoke that also have other common exposure sources, such as auto exhaust and air pollution.

- The report **calls out three specific chemicals -- ethylene oxide, benzene, and 1,3-butadiene** – saying both animal and human studies indicate breast cancer risks. As far as we know, this is the first statement by an authoritative medical group linking any specific environmental chemical to breast cancer. Primary exposures to benzene and 1,3-butadiene are from gasoline, air pollution, and auto exhaust. Ethylene oxide is a sterilant used, for example, in medical settings and food sanitation. All three chemicals are in tobacco smoke. Silent Spring Institute previously highlighted these chemicals (among a few others) in our 2007 review of [environmental factors and breast cancer](#), and their targeting by the IOM committee extends this previous work. We hope the IOM report will lead to greater worker protections, including access to mammography and breast cancer treatment, and make it easier for researchers who want to study these exposures to get funded. If the report’s research recommendations related to environmental chemicals are implemented, we expect the list of chemicals with similar evidence will grow longer.
- **Our own list of chemicals with both human and animal evidence of breast cancer risk is longer than the IOM’s and includes polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and common organic solvents.** Current exposures to PCBs, which are banned, come primarily from consumption of certain fish, and from air in older buildings, including schools and homes where they were used in floor finishes and caulks in the 1950s and 1960s. PAHs are ubiquitous air pollutants and found in tobacco smoke and grilled food. Common organic solvents such as methylene chloride are used in glues, spot removers, dry cleaning, and other consumer products; they are common drinking water contaminants and many people are exposed in the workplace. The possibility that many organic solvents increase risk deserves particular attention, because alcohol, a recognized breast cancer risk factor, and benzene, highlighted by the IOM, fall into this chemical class. The evidence so far suggests that higher risks for PCBs, PAHs, and solvents may be limited to genetically susceptible people or those exposed at an early age, but breast cancer is so common that these subgroups of the population are large.
- **It’s also an oversight that the IOM document does not mention an important study by Kaiser Permanente on breast cancer risk among women taking pharmaceuticals that cause mammary gland tumors in animal studies.** This study showed increased breast cancer risk from griseofulvin (an antifungal) in particular and also from furosemide and metronidazole (Friedman et al. 2008). While it is an important step that the IOM recommendations (#10, 11) suggest better pre- and post-market testing of hormonally-active pharmaceuticals for breast cancer risk, it would be better to extend the recommended safety testing to include other pharmaceuticals, especially those that cause breast tumors in animals.
- **The IOM highlights chemicals with hormonal activity, including perfluorinated compounds, bisphenol A, and the pesticide atrazine, as priorities for research,** because the evidence of plausible biological links to breast cancer is “provocative” but difficult to interpret so far. Their recommendation for research to evaluate “the persistence and consequences for mammary carcinogenicity of abnormal mammary gland development and related intermediate outcomes observed in some toxicological testing” is drawn from Silent Spring Institute’s [recent publications](#) that call for toxicological testing to assess the effects of chemicals on breast development and cancer susceptibility.
- **What’s needed now is a clear statement by cancer heavyweights like Komen, the sponsor of the IOM report, saying the evidence of links between chemicals and breast cancer is mounting, and we’re past the point where we don’t know enough to act.** We desperately need breast cancer organizations to work for chemical safety testing for effects on breast cancer,

reform of the Toxic Substances Control Act, and pollution policies that recognize breast cancer among the risks. **We also need them to invest in the IOM's prevention research agenda on par with investments in improved screening and treatment.** The report includes ambitious research recommendations to improve ability to test chemicals, interpret results, and study exposures in humans, but these are all expensive and there are currently few governmental or breast cancer organizations funding this work, aside from the forward-looking [California Breast Cancer Research Program](#). The \$5 - 7M in new prevention grants announced by Komen is not enough.

We read the IOM report with particular interest, because Silent Spring Institute led a team that reviewed the scientific evidence on environmental factors and breast cancer in a 2007 supplement to the American Cancer Society's peer-reviewed journal, *Cancer*. That project, like the IOM report, was funded by Komen for the Cure. The new report builds on our earlier *Cancer* papers and our more recent studies. We hope that by highlighting the increasing evidence of plausible links, the IOM's work will lead to a new national focus on environmental chemicals as an important focus for breast cancer prevention.

Breast cancer is still a killer, the leading cause of death for women in mid life, and an enormous source of suffering for the 230,000 US women diagnosed each year. Nearly everyone knows someone close who has been through debilitating treatment, fueling an urgent cry for insights into prevention and evidence about what's safe. This report provides evidence for action and a crucial agenda for research to change the legacy of breast cancer for our daughters' generation. **Because breast cancer is so common and the suspect chemicals so widespread, the nationwide benefit of finding and eliminating the risks would be large, even if the incremental risk to any one woman is small.**

[Read our commentary on news media coverage of the IOM report](#)

[Read the full Institute of Medicine report *Breast Cancer and the Environment: A Life Course Approach*](#)