

## Cancer: How Dangerous Are Our Cosmetics?

Toxic chemicals don't just hurt us in big doses. An environmental oncologist argues that myriad tiny amounts of cancer-causing agents in our environment—and even in our shampoo—can make us sick.

WEB-EXCLUSIVE COMMENTARY

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Feb. 15, 2007 - We know that children are not simply little adults. With their quick heartbeats, fast-growing organs and enviable metabolism, the young absorb proportionally more pollutants than those who are older. **Exposures to minute amounts** of hormones, environmental tobacco smoke or pollutants early in the life of an animal or human embryo can deform reproductive tracts, lower birth weight and increase the chance of developing cancer. And yet results from an independent chemical testing laboratory released last week found a probable human carcinogen, 1,4-dioxane (also known as para-dioxane), in some common children's shampoos at levels higher than those recommended by the **U.S. Food and Drug Administration**. The Environmental Working Group, [www.ewg.org](http://www.ewg.org), a research and advocacy organization that ran the study, estimates that more than a quarter of all personal-care products sold in the United States may contain this cancer-causing agent.

The presence of a cancerous agent at levels above those suggested by the FDA is disturbing enough. The idea that such a compound exists at any amount in products that can be in regular contact with babies' skin is even more disconcerting. Scientists have long known that certain chemicals like para-dioxane can cause cancer. (The World Health Organization considers para-dioxane a probable human carcinogen because it is proven to cause cancer in male and female mice and rats.) Now we're beginning to realize that the sum total of a person's exposure to all the little amounts of cancerous agents in the environment may be just as harmful as big doses of a few well-known carcinogens. Over a lifetime, cigarettes deliver massive quantities of carcinogens that increase the risk of lung and other cancers. Our chances of getting cancer reflect the full gamut of carcinogens we're exposed to each day—in air, water and food pollution and in cancerous ingredients or contaminants in household cleaners, clothing, furniture and the dozens of personal-care products many of us use daily.

Of the many cancer risks we face, shampoos and bubble baths should not be among them. The risks of para-dioxane in American baby soaps, for instance, could be completely eliminated through simple manufacturing changes—as they are in Europe. To remove such carcinogens, however, would require intervention by the federal government, but the federal **Food, Drug and Cosmetic Act** allows the industry to police itself. **Europe has banned** the use of para-dioxane in all personal-care products and recently initiated a recall of any contaminated products. There's a problem with the way the United States and other countries look at toxicity in commercial agents. Regulators nowadays often won't take action until enough people have already complained of harm. This makes little sense. Scientists can seldom discern how the myriad substances, both good and bad, that we encounter in our lives precisely affect our

health. We need to be smarter about using experimental evidence to predict and therefore prevent harm from happening. A few decades ago, people accepted the fact that cigarette smoking was harmful, even though no scientist could explain precisely how this happened in any particular cancer patient. If we had insisted in having perfect proof of how smoking damaged the lungs before acting to discourage this unhealthy practice, we would still be questioning what to do. By the same token, we now have to get used to the idea that scientists are unlikely to be able to say with certainty that a trace chemical in shampoo accounts for a specific disease in a given child. But if we're to reduce our cancer risk, we need to lower our exposures to those agents that can be avoided and find safer substitutes for those that can't.

Scientists don't experiment on humans, for obvious reasons, but we have found some clues from lab and wildlife studies. Medical researchers have demonstrated that trace chemicals of some widely used synthetic organic materials can damage cultured human tissue. The effects don't just accumulate, they mushroom. UC Berkeley Professor Tyrone Hayes has shown that very low levels of pesticide residues in Nebraska cornfields can combine to create male **frogs with female features** that are vulnerable to infection and can't reproduce.

Should we wait for these same things to happen to baby boys before acting to lower exposures? There's plenty of solid human evidence that combined pollutants can cause more harm together than they do alone. We are not surprised to hear that people who smoke, drink and work as painters have much higher risks of kidney cancer than those who only engage in one of these known cancer-causing practices. We also understand that women who use hormone-replacement therapy and drink more than two glasses of wine daily have higher risks of breast cancer than those who engage in only one of these practices. This tells us that other combinations of chemicals in the environment can also lead to other cancers. One in five cases of lung cancer in women today—a disease that kills more women than ovarian, breast and uterine cancer combined—has no known history of active or passive smoking exposure. Rates of **non-Hodgkins lymphoma** and other cancers not tied with aging or improved screening have also increased in many industrial countries. New cases of testicular cancer continue to rise in most industrial countries. While still rare, childhood cancer is more common today than in the past, and most cases occur in children with no known inherited risk of the disease.

The problem, from a scientific standpoint, is that resolving the effects of miniscule levels of chemicals we encounter throughout our lives is part of a complicated puzzle for which many pieces are missing. What scientists need is data—lots of it. Manufacturers, however, tend to hold the precise formulations of products as trade secrets, and the law allows them to withhold much information about carcinogens even if they are known to be present. Of course, we should continue to collect information to advance our ability to prevent cancer and other chronic diseases. But when a chemical causes cancers in both sexes of two different species of animals, we shouldn't arrogantly presume we will escape a similar fate. Recent work on the human and animal genomes shows us that humans differ from frogs and mice by fewer than 10 percent of genes. We should not let the absence of specific information on the health consequences for our infants and toddlers of single cancer-causing contaminants like para-dioxane become a reason to delay getting rid of such hazards.

The goal of public-health policy is to prevent harm, not to prove that it's already happened. The Center for Environmental Oncology at the University of Pittsburgh Cancer Institute advises that personal-care products that contain hormones may, in part, account for the continuing and unexplained patterns of breast cancer in African-Americans under age 40, and also may explain why more girls are developing breasts at younger ages. The Centers for Disease Control and Prevention found generally higher residues of some plastic metabolites in African-American women, with children ages 6 to 11 having twice the levels of whites. Dr. Chandra Tiwary, a recently retired military chief of pediatric endocrinology at Brooks Air Force Base, found that African-American baby girls as young as 1 year old developed breasts after their parents applied creams that they hadn't realized contained estrogen to their scalps. When the creams were no longer used, these infant breasts went away. **Other work published last week by the National Institute of Environmental Health Science**, shows similar effects in young boys who had been washed with some hormone-mimicking soaps or oils. After their parents stopped applying these products, their breasts also receded.

In light of the growing numbers of young girls with breasts, the **Lawson Wilkins Pediatric Endocrine Society**, the certifying board for pediatric endocrinology, in 1999 changed the recommendation of what is natural. We believe this would be a dangerous move. If we say that it's now normal for African-American and white young girls to develop breasts at ages 6 and 7, respectively, we will fail to pick up serious diseases that could account for this. We will also lose the chance to learn whether widely used agents in the environment, like those found in personal-care products today or others that may enter the food supply, lay behind some of these patterns.

It should not be the job of scientists, or of public-spirited leaders or environmental groups, to find out what contaminants or ingredients may be affecting the delicate endocrine systems of our children and grandchildren. (The tests that found para-dioxane in shampoo were funded privately by environmental journalist and activist David Steinman, author of "Safe Journey to Eden.") Manufacturers have known for years about how para-dioxane forms as a by-product of manufacturing and how to get rid of it. Until now, they just haven't need to do so. People have a right to know whether products they use on themselves and their children contain compounds that increase their risk of disease. They also have a right to expect that government will prevent companies from selling products that are harmful to children. To do otherwise is to treat our children like lab rats in a vast uncontrollable experiment.

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