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Should I worry about health effects from BPA?

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Q. Is the concern about the chemical BPA just another health scare, or is BPA really something we should be worried about?

A. BPA, which stands for bisphenol A, is estrogenic. That means that in some respects it behaves like the hormone estrogen. Although BPA was first developed as a synthetic estrogen, it was never used as a pharmaceutical because diethylstilbestrol (DES), another synthetic estrogen, was more potent. DES was pulled from the market in the 1970s after it was discovered that the daughters of the women who took it (extra estrogen was thought to reduce the risk of miscarriages and premature births) were more likely to have a rare type of vaginal cancer, and later studies found they also had a variety of fertility and other health problems.

But BPA turned out to have a second career, so to speak, as a compound that would be polymerized -- made into long chains -- to make a plastic known as polycarbonate. While not as clear as some plastics, polycarbonate is sturdy and resists shattering, so it's a great material for water bottles and baby bottles. It's used in some dental sealants and composite white fillings. BPA has proved useful as an ingredient in an epoxy resin applied to the insides of cans so the metal of the can is not in direct contact with the food or beverage. BPA is also used as an ingredient in the powdery coating found on the thermal paper that many receipts are printed on these days.

There's no question that we're exposed to BPA and that it can get inside our bodies. Over 90 percent of Americans were shown to have measurable amounts of the chemical in their urine. With wear and washing, polycarbonate plastic breaks down, so some of those long chains break down to the simpler compounds -- called monomers -- that have estrogenic properties. In 2008, colleagues of mine at the Harvard School of Public Health conducted a study that involved having Harvard College students drink cold beverages from polycarbonate drinking bottles for a week. The level of BPA in their urine increased by two-thirds.

But the main BPA exposure for adults in this country and elsewhere is believed to be from canned food, because BPA leaches out of the lining of cans. Infants can be exposed from the linings of cans infant formula comes in and from polycarbonate baby bottles, which are largely no longer sold in this country.

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The hard question to answer, though, is whether any of this exposure causes harm. I was a member of the World Health Organization expert meeting on toxicological and health aspects of BPA. The report summarized epidemiologic studies that have shown links with several health outcomes, from poor semen quality to diabetes to behavioral problems in young children. But most of the studies have been cross-sectional snapshots that depend on one measurement of urinary BPA. That kind of research can suggest the need for more research of a possible connection. It can't determine cause and effect.

Usually toxicological research, which tests the effect a chemical has on cells and animals, is a major factor in determining whether a substance is harmful or not. BPA hasn't been ignored by toxicologists: At least 500 toxicological studies have been published. But in my experience, BPA is unusual in how much controversy it has created. Toxicologists disagree about what is the best design for studies on BPA, how to deliver the BPA dose, what doses to test, and which outcomes to measure. So rather than sending a clear message, the BPA toxicology research has added to the uncertainty about how dangerous this chemical really is.

I have mixed feelings about all the focus on BPA. I study other chemicals in consumer products, like phthalates and parabens in cosmetic products. It probably doesn't make a lot of sense to be hypervigilant about just one chemical, BPA, when there are hundreds of others we should also be concerned about and studying in a more systematic way.

At the same time, given what we know from the studies on experimental animals and the limited studies in humans, I think it makes sense to be appropriately cautious about BPA exposure and limit it where we can. The canning industry is looking for substitutes for the lining of food and beverage cans. As individuals, we can lower our exposure by eating less canned food and more fresh fruits and vegetables, which is always a good thing. Parents can buy products that aren't made of polycarbonate (that means avoiding products with a 7 recycling label). You can also switch from polycarbonate water bottles to stainless steel ones, which (unlike the aluminum ones) tend to be unlined.

Although making these individual decisions can lower your personal exposure, it's my hope that government regulatory agencies will use the best available science to make decisions about the commercial use of BPA that will protect public health. -- Russ Hauser, M.D., Sc.D., M.P.H., Professor, Department of Environmental Health, Harvard School of Public Health

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