Health experts step up debate over safety of plastics
By Ranit Mishori
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WASHINGTON — When people say plastics are everywhere, they really mean everywhere: in the containers that hold your food; in the pipes that carry your water; in the bottles you use to feed your infant; in windows frames, shower curtains and raincoats; in eyeglasses and safety helmets; in phones or keyboards. They’re in clothing; they’re in toys; they’re in bandages, lipstick and nail polish.

So ubiquitous. So useful. And, some say, so dangerous.

Many scientists and environmental advocates believe man-made components in plastics — particularly a group of compounds called phthalates and another hormonally active chemical known as bisphenol A, or BPA — can leach harmful chemicals that get absorbed into our bodies. Some blame plastics for increased rates of cancer, asthma, neurological disorders and infertility.

Those fears, debated for more than a decade, were ratcheted up last week by two events: A draft report by the National Toxicology Program acknowledged for the first time “some concern” that BPA may affect neural and behavioral development “in fetuses, infants, and children at current human exposures.” The federal health agency’s report included early puberty in girls and hyperactivity among these developmental disturbances. And Health Canada, the main government health department for that country, designated BPA as a “dangerous substance,” moving Canada a step closer to limiting the chemical’s use.

“The health impacts associated with these chemicals are very severe,” says Michael Schade of the Center for Health Environment and Justice, an advocacy group that wants these components banned from consumer products.

Some government and academic experts agree. People worried about chemicals in plastic aren’t just “nervous Nellies,” says Lynn Goldman, a professor of environmental health sciences at the Johns Hopkins Bloomberg School of Public Health.

Others, led by the plastic and vinyl industry, say recent reports are nothing but a scare campaign. “It is ... foolish to ban something that’s safe and has proven itself for decades,” says Allen Blakey, a spokesman for the Vinyl Institute, an industry group. Blakey dismisses the main evidence of harm cited by the anti-plastic camp — a set of studies that involved mostly animal subjects — as “flimsy.”

The financial stakes are huge: Plastics is the country’s third-largest manufacturing industry, employing 1.1 million workers and producing nearly $379 billion worth of goods each year, according to the Society for the Plastics Industry.

The battle lines are clear. But not the science.

Before the recent report, independent panels sponsored by the National Institutes of Health, the Environmental Protection Agency, the Consumer Product Safety Commission and the Food and Drug Administration examined the data on plastics safety and drew conflicting conclusions. Michael Shelby, an official with the National Toxicology Program, calls the debate over plastics safety “very polarized.”

“Similar to the tobacco companies” is how Schade describes the chemical industry’s tactics in defense of plastics, including “hiring scientists to put out questionable studies.”

“A political campaign by extremist groups to demonize materials that have been very useful” is what Blakey calls the anti-plastics movement.

And consumers? They’ve been left to sort out the mess on their own.

First, a look at BPA.

It’s in CDs, dinnerware and sports safety equipment; incubators, heart-lung machines and IV bags; bottle tops, packaging, dental sealants and Nalgene bottles.

It is also in our bodies. A Centers for Disease Control and Prevention (CDC) analysis detected BPA in urine samples of nearly 93 percent of 2,517 people who took part in a national health survey from 2003 through 2004.

According to the CDC, women had higher average levels (2.9 micrograms per liter) than men (2.6); children age 6 to 11 had...
higher levels (4.5) than adults over 20 (2.5). These numbers are not in dispute.

Virtually everything else is, starting with what BPA’s presence in urine might mean. It could be evidence that the chemicals reside in our body tissue or bloodstream; it could also suggest that our bodies know how to expel them.

Then there’s the question of how these chemicals might have gotten there. “What’s hard to do is connect the dots,” Goldman says, “between finding it in people’s urine and which uses are causing the chemicals to be in their urine — to understand what the pathways of exposure are.”

Also unclear is whether having BPAs in our bodies is dangerous.

“It is very difficult to show that exposures lead or have led to adverse health effects in humans,” says Shelby, director of the National Toxicology Program’s Center for the Evaluation of Risks to Human Reproduction. (The toxicology program is part of the National Institutes of Health.)

Nonetheless, in a report this winter titled “Toxic Baby Bottle,” a group of U.S. and Canadian environmental and public health groups reviewed studies showing BPA’s tendency to leach out of plastic (and into foods and liquids) when heated. The group called on government agencies in both countries to impose “an immediate moratorium on the use of bisphenol A in baby bottles and other food and beverage containers.”

The American Chemistry Council, representing many companies in the plastics industry, protested that the study subjected bottles to higher temperatures than are commonly used and for longer times. “Polycarbonate baby bottles have a 50-year safety track record,” reads a statement from the council, which said the report provided no new relevant information on BPA safety.

But the people behind the baby-bottle report argue that exposure — in and of itself — is evidence of harm. “There is growing scientific evidence that shows that BPA is harmful even at extremely low levels of exposure,” Schade says.

He points to a large body of studies on animals in which BPA caused alterations to the reproductive, neurological and metabolic systems. “Scientific studies on lab animals,” Schade says, “show that BPA might have adverse health impacts ranging from breast and prostate cancer, thyroid disease, early puberty in girls and ADHD.”

But animals are not humans, and Blakey says findings from animal studies “are often not translatable to humans.”

The Coalition for Consumer Choice, an industry group made up of organizations, associations and businesses “committed to supporting the continued safe use of everyday products made from bisphenol A,” adds that “human exposure levels are typically more than one million times lower than levels shown to cause no adverse effects in experiments involving multiple generations of laboratory animals.”

That said, virtually any scientific investigation into the safety of suspect chemicals and drugs starts with animal models, because of ethical concerns about exposing humans to toxins. Lab work with animals has often resulted in specific recommendations related to humans.

In 2006, an independent panel of experts assembled by the NIH and the EPA looked at more than 700 BPA studies and concluded that the mechanism by which it affects cells and tissues is essentially identical in animals and humans. The panel concluded that the animal studies of BPA should be taken seriously as an indicator of potential harm to humans.

The next year, another panel — organized by Shelby’s center — issued a far less alarming review of about 500 studies. But the panel’s integrity was damaged by a finding that a company hired to compile data for the report had a conflict of interest.

The U.S. chemical industry is more at odds with overseas practices in its use of the other controversial component of many plastics: the group of compounds called phthalates. Phthalates are banned in the manufacture of toys in most European countries. A similar ban exists in California, and 12 other states are considering bans.

Phthalates are also known as plasticizers, chemicals that prolong the life span and durability of plastics and increase their flexibility. Like BPA, phthalates are used in hundreds of products, including vinyl floors, adhesives, food packaging, automotive parts, clothing and personal-care products such as soap, shampoo, hair spray, nail polish and underarm deodorants. According to the FDA, phthalates are used at low concentrations to reduce cracking of nail polish, avoid stiffness in hair sprays, and as solvents and perfume fixatives in various other products.

Within this group of chemicals, two are under particularly close scrutiny — DEHP, found mostly in medical products, and DINP, found mostly in toys — for their potential toxic effects on the reproductive and endocrine systems.

Again, industry representatives such as the Vinyl Institute’s Blakey say “there is no proof that phthalates have ever caused harm to humans.” The FDA, looking into the use of phthalates in cosmetics, reported that the data it reviewed “did not establish an association between the use of phthalates in cosmetic products and a health risk.” As a result, the FDA determined there...
was "insufficient evidence upon which to take regulatory action."

As with BPA, the evidence is mostly limited to animal studies.

One of the few human studies, published earlier this year in the journal Pediatrics, found that the urine of infants recently exposed to baby lotion, powder and shampoo had higher levels of phthalates or their byproducts. But the study did not prove the products used were responsible for the elevated readings.

Last year, a study in Environmental Health Perspectives found that higher levels of phthalate byproducts correlated with obesity and insulin resistance. Another study in the same journal found that higher levels of phthalate byproducts in urine were associated with abnormal thyroid hormone levels in adult men.

Advocacy groups haven't succeeded in their calls for a comprehensive ban on phthalates and BPA, but some national retailers (including Target and Wal-Mart), manufacturers (including Microsoft, Johnson & Johnson, Nike and Apple) and toymakers have begun voluntary efforts to remove phthalates from their products.

Meanwhile, consumers who might want to limit their exposure to suspect chemicals in plastics may find that difficult. Plastics components must be labeled in some products, but not in others.

"Most people haven't had college-level chemistry or advanced chemistry," to know what the alphabet soup of chemicals on labels mean, says Caroline Baier-Anderson, a health scientist with the nonprofit group Environmental Defense and an assistant professor in the Department of Epidemiology and Preventive Medicine at the University of Maryland at Baltimore.

She urges consumers to make the best choices they can. But, she says, "we can expect our government to do more."

Goldman agrees that better product labeling "needs to be dealt with at the pre-consumer level" — before products get to the shelves — and urges the manufacturers, too, to "step up to the plate."

One thing nearly everyone agrees on: More science is needed — more studies of short- and long-term effects, new models of interpreting animal research, better testing methods.

The case of BPA and phthalates is "more subtle" than the classic "one chemical, one disease" model, says Baier-Anderson, as in the case of asbestos or tobacco.

Above all, she says, "we need a meaningful dialogue regarding the interpretation of scientific data, however it is generated."