



Understanding and Reducing Microplastic Exposure

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In recent years, the use of plastic products has become ingrained in our daily routines. We pour our breakfast cereal out of a plastic bag, we squeeze lotion from a plastic container, we work at a desk made of plastic, we might even be drinking **tea** that was steeped in a sachet made of plastic. No wonder tiny plastic fragments and particles (collectively called microplastics) are being found in the depths of the ocean and in our bodies—our **blood** and even our **lungs**. Exposure to harmful substances like microplastics begins as early as before **birth** and can affect everyone, given how ubiquitous plastic is; it is equally important to understand, however, that the accumulation of microplastics in the body can depend on where a person lives, the nature of their work, and a variety of other socio-economically linked behaviors. Equitably addressing microplastics' effects, therefore, calls for a multi-pronged approach that should include top-down interventions like manufacturing regulations with targeted support for socio-demographic groups that have higher risks of exposure.

How Microplastics Cause Harm

Microplastics are made of phthalates, which are chemicals used to make plastics flexible and durable. Phthalates can make their way into bodies through ingestion, inhalation, and absorption via our skin. Scientists can gauge phthalate accrual by measuring the amounts of phthalate metabolites—the leftover traces of these substances after they have been metabolized, or broken down by the body—in urine. Phthalates in the body are endocrine disrupting chemicals; they are associated with negatively affecting metabolism (contributing to disorders like insulin resistance), allergic symptoms, and differential brain development.

While the categorization of phthalates may not be common knowledge, media coverage of the FDA's banning of the chemical compound BPA (Bisphenol A) in 2012 introduced many Americans to the harms that unfortunately accompany the convenience of plastics. It is not uncommon for a person to espouse beliefs that plastics are “less healthy or safe”—but less healthy and safe than what? Meanwhile, although the banning of BPA was a positive development, there are an abundance of other phthalates that are *not* banned that cause similar harm and are still found in items like toys and baby bottles. Avoiding harmful phthalates, therefore, is a task that often falls to individual consumers; limiting exposure will depend on their knowledge of the problem, and their ability to choose where they live and work and what they buy and consume. So, who gets to choose health and safety, and who does not?

“Lifestyle,” “Choice,” and Unequal Protection

In her book *Epidemiology and the People's Health*, the epidemiologist Nancy Krieger warns of the prevailing trend toward “lifestyle” framing and the concept of choice when considering individual health. The concept of a “healthy lifestyle” puts an emphasis on an individual's choices and behaviors, and suggests that good or bad health outcomes are the results of those personal decisions. While there are healthy and unhealthy behaviors, of course, the book and the wider literature highlight how the “lifestyle” conceptualization within the public health sphere was only recently popularized in the 1990s, and how it shifts the burden of increasing good *public* health outcomes onto *individuals* and their supposed personal choices. It is essential to unveil the social and structural systems that unequally offer certain lifestyles—or simply the privilege to choose how, where, and with what we live—to certain populations, and therefore, unequally result in improved health outcomes.

Socio-demographic characteristics including one's age, gender, education, race/ethnicity, income level, and citizenship status interact with (and shape and are shaped by) where one lives, their built-environment exposures, their time-use patterns, their occupation, their treatment at healthcare facilities, and their purchasing patterns to shape phthalate exposure. Consequently, some socio-demographic groups have more phthalates in their bodies than others. It is critical to understand health experiences outside of clinical

definitions, drawing attention to structural vulnerabilities and the way that environmental toxicants are embodied in individuals and populations. To reverse the trend toward greater phthalate exposure, it is essential to use federal policy to eliminate the barrier of choice from the public health equation—so that, for example, one's phthalate burden does not depend on whether they can afford to buy glass containers instead of plastic, or on whether they even know why the difference might matter.

Equitable Solutions

The Campaign for Safe Cosmetics is an example of how policy action led to a marked reduction in phthalate burden in the U.S. population. This program, run by a national science-based advocacy organization, strives to prevent breast cancer by creating awareness and motivating industry changes to eliminate environmental exposures linked to breast cancer; this advocacy has resulted in federal and state laws that ban some chemicals and regulate cosmetic manufacturing. Researchers have found that there was a **decline for phthalates** that are the biomarkers for chemicals that have been banned in recent years (like DEP, DnBP, BBzP, and DEHP); however, they also note a modest increase for unbanned chemicals (DiBP and DiNP)—and importantly, they found phthalates in all participants sampled.

Due to how entirely plastics have infiltrated our modern lifestyle, a multi-pronged approach is necessary to mitigate the risk of phthalates in society. Policymakers and citizens can advocate for:

- More rigorous industrial regulations of food product packaging and ingredients in personal care products
- Consistent public health surveillance of phthalate exposure
- Active interventions to reduce exposure among those identified as having a higher phthalate burden (families with low household education, Black people, people identifying as female, older individuals, and non-U.S. citizens)
- Health literacy programs to educate the public about where and how phthalate exposure occurs

These interventions could reduce socio-demographic differences in phthalate levels that researchers have uncovered while reducing phthalate levels for all.

Research and data for this brief are drawn from Nancy Krieger, *Epidemiology and the People's Health: Theory and Context* (Oxford University, 2011); and Ami R. Zota, Antonia M. Calafat, and Tracey J. Woodruff, "Temporal Trends in Phthalate Exposures: Findings from the National Health and Nutrition Examination Survey, 2001–2010." *Environmental Health Perspectives* 122, no. 3 (2014): 235–241.