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I FOUGHT PLASTIC. PLASTIC WON.

My futile quest to avoid the material that my entire world is made out of

By Annie Lowrey

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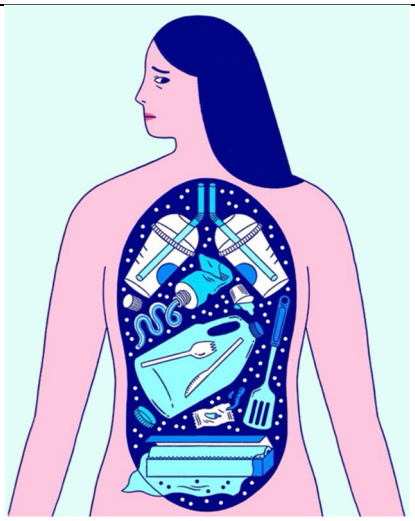

Illustration by Josie Norton

I USED TO love my Teflon pans. I crisped tofu, fried latkes, and reduced sauces to sticky glazes in them, marveling at how cleanup never took more than a swipe of a sponge. Then I started to worry that my skillets might kill me.

The lining on the inside of a nonstick pan is made of plastic. When heated, it can release toxic fumes; when scratched, it can chip off, blending in with tasty bits of char and grains of pepper. "Data indicates that there are no health effects from the incidental ingestion of nonstick coating flakes," the company that produces Teflon says, noting that the government has deemed the cookware "safe for consumer use." Still, it warns people to turn their burners down and air vents up when they use their nonstick pans, and to avoid preheating them empty.

Other data, a lot of data, suggest that ingesting plastic can damage your organs, suppress your immune system, harden your veins, and predispose you to neurodegenerative diseases and cancer. Pet birds have died of the "Teflon flu" after breathing in the smoke from their owners' overheated pans. (Birds' lungs are especially susceptible to toxic gases.) A story about a budgie did it for me. I tossed my nonstick pans into the trash, over my husband's objections.

Thus began my slowly escalating, dimly informed campaign to rid my body and life of plastics. I heard a local-radio report on colorectal cancer and impulse-purchased metal baby spoons for my kids at 3 a.m. I recalled a column on endocrine disrupters from who knows when and started drinking my iced coffee from a metal-lined tumbler. I read something about how flexible plastic is particularly problematic and threw out the cling wrap. I got rid of our black plastic spatulas too, after one of my colleagues reported that they might contain flame retardant, which you're really not supposed to eat.

I was doing my own research, by which I mean I was taking in data from disparate sources with differing degrees of credibility on a bewilderingly complicated issue and analyzing it with sophomore-year scientific literacy before making consumer decisions driven by single-issue neuroticism and a penchant for online shopping. I was also annoying the bejesus out of my husband, who kept asking where the pancake flipper had gone.

Then I read an article suggesting that microplastics might be behind the increasing incidence of type 1 diabetes, which I happen to have. I recalled all the molten Stouffer's lasagnas I had eaten as a kid. I needed to do something right now, but I realized that I had already purged the obvious offenders from the kitchen.

Before I could buy something expensive and relax, I stopped, for once. Was I actually reducing my exposure to dangerous chemicals? Was my family safer than it had been before I began my campaign? What kinds of plastic are truly dangerous in the first place? I had no idea. More than I wanted to spend hundreds of dollars at Williams-Sonoma, I wanted to know my enemy.

AN ENCOMIUM FOR the adversary: Plastics are amazing. The synthetic polymers are light and inexpensive, moldable and waterproof, stretchy and resilient. They are also new. The fax machine was invented before plastic was. Plastics have made us safer in a thousand ways: Much-castigated plastic water bottles make the storage and transportation of clean drinking water easy; single-use surgical gear is better at preventing infection than boiled linen. Plastics have also dramatically cut the cost of making and moving things, powering our modern consumer economy no less than gas and electricity have.

Plastics are the consumer economy, to a remarkable extent. I knew that fleece and diapers were made from plastic. I was surprised to find out that tea bags, sponges, glitter, paint, cigarette filters, nail polish, chewing gum, toothpaste, mattresses, dental floss, wet wipes, and tampons commonly contain plastic too. The Boeing 787 Dreamliner is half plastic composites. Even things that seem like they have nothing to do with plastic are plastic. Aluminum soda cans are lined with an epoxy resin, meaning my predominant source of liquid (room-temperature Diet Coke; not ashamed) essentially comes in a plastic bathtub.

This past spring, I decided to see how long I could go without using plastic. I woke up on linen and cotton sheets and glowered at my iced coffee, chilling in its off-limits plastic bottle in the refrigerator. Head aching, I went to get ready for the day. I couldn't turn on the light in my closet or my bathroom. Nor could I brush my teeth, or put on deodorant, moisturizer, sunscreen. The only outfit I could conjure up was a capacious linen shift and a saggy cotton-wool cardigan. No underwear or socks, because they have some stretch to them, and if something stretches, it's thanks to plastic. I could not traipse into my office looking like Gollum's great-aunt, nor could I commute without shoes on. Eighteen minutes after waking up, I surrendered.

Plastic is not just everywhere in our homes, but everywhere, period. The world produces so much plastic (more than 400 million metric tons a year, according to one estimate - roughly the combined weight of every human alive) that degraded nubbins coat the planet, detectable in the sedimentary depths of the Mariana Trench and the icy heights of Mount Everest.

The human body itself is part plastic: We are humans made of a human-made material. Scientists have found plastic in brains, eyeballs, and pretty much every other organ. We cry plastic tears, leak plastic breast milk, and ejaculate plastic semen. Fetuses contain plastic. Plastic is so ubiquitous that researchers, wanting to examine the effect of plastics on the human body, are struggling to find all-natural individuals to use as controls in studies.

CONCERNS OVER PLASTIC exposure have exploded in recent years, with podcast bros, MAHA types, and crunchy moms joining environmentalists (and a number of physicians and scientists) in attempting to ditch the substance. Businesses have started offering direct-to-consumer blood tests for microplastics and related contaminants. (Until I started writing this story, the distinctions were lost on me: We are exposed to bits of plastic, known as nanoplastics or microplastics, and plastic-related chemicals, which can leach out of plastics. The latter can include PFAS, "forever chemicals" with particularly worrisome health implications.)

Curious to know how plastic I am, I coughed up $357 (and some plastic particles, probably) and visited a Quest Diagnostics. "I've never seen anyone get this test before," the phlebotomist whispered, before puncturing my vein.

The results came back a week later: I had 2.06 nanograms of PFAS in every milliliter of my blood, an "intermediate" quantity implying a "potential risk of adverse health effects." Specifically, the test found perfluorononanoic acid, perfluorohexanesulfonic acid, n-perfluorooctanoic acid, n-perfluorooctane sulfonic acid, and perfluoromethylheptane sulfonic acid isomers swimming around in my blood.

Knowing what I already knew, I would have been shocked if the test had come back negative. But I still felt concerned. Quest provided me with a phone number to set up a consultation with a physician to discuss my results. I called, hoping someone could tell me what, if anything, I should do with this information.

The numbers were "very good news," the physician told me at first, saying that my report indicated the chemicals were "not detected." But some substances were detected, I pointed out. What did that mean? "I see why you're confused; your level is higher," she told me. "You have to address this to the lab." After a few minutes of poring over the numbers, she added, "This is very confusing, even for me."

We went back and forth on safe levels and detectable quantities before I asked her what it meant to test positive for these substances in general. "There's not much for us to do but to alert you," she said. "Everything is made from chemicals, and things are made in China and they don't have high levels of quality control. That's what the modern world has to offer us." She told me to watch out for breast cancer.

I was already doing that. I had read studies linking PFAS to developmental delays, liver damage, kidney cancer, and thyroid disease, among other conditions. Phthalates, used to make plastic flexible, are associated with early menopause and miscarriages. Microplastics and nanoplastics are mixed in with the sand on beaches and float in bottles of distilled water at the grocery store. Nascent research ties them to strokes and lung cancer. How many horrid diagnoses did I need to be on the lookout for?

I could be as vigilant as I wanted to be, but the Quest test was essentially meaningless. It gave me a point-in-time estimate of a handful of kinds of PFAS in my bloodstream. But it provided no sense of my lifetime exposure, nor could it help diagnose a current illness or predict my likelihood of disease going forward.

Kjersti Aagaard is a physician specializing in maternal-fetal medicine whose research

demonstrates where the science is today. She recently co-authored a paper showing that the placentas of preterm infants contain more tiny plastic particles than those of full-term infants. Microplastic accumulation might alter blood-vessel development in the womb, increasing the risk of preterm birth, she told me. But she and her colleagues had "no data" demonstrating how microplastics caused early deliveries, if they were causing them at all.

Still, scientists know more than enough to be concerned. Research indicates that plastic chemicals can bind to hormone receptors, kill cells, and damage DNA. Studies show that the degree of exposure to plastics corresponds to the incidence of disease. We don't know yet "if this is 'Silent Spring 2.0,'" Aagaard wrote in an email. We may not know for a long time. But that doesn't mean we shouldn't work to reduce the risks now.

THAT WAS MY next project, and I conscripted Tracey Woodruff, the director of UC San Francisco's Program on Reproductive Health and the Environment. Yes, she said, there were straightforward, scientifically informed ways for people to protect themselves. Plastic and plastic-related chemicals have to get into your body to hurt you. You have to consume them, breathe them in, or absorb them through your skin. Cut off the supply lines and hamper the enemy.

She told me she sympathized with the urge to buy your way out of harm, but noted that wealthy people have more PFAS in their bodies than lower-income people, perhaps because they buy so much more stuff. Some fixes involve spending money, but many don't; people should just do what they can, she said. In the kitchen, opt for glass and stainless-steel containers, and throw away degraded plastic tools. Avoid doing anything to heat or agitate I plastic, so quit putting plastic containers in the microwave and kiddie cups in the dishwasher. Food and beverages themselves carry plastic particles, so avoid processed foods. "Eat less takeout and fast food, eat less packaged food, and eat more food prepared in your home; that can reduce your exposure," she told me.

Elsewhere in the home, you can replace polyester rugs, vinyl fabrics, and microfiber towels with alternatives made from linen, cotton, leather, or wool. You can rip up your carpet and opt for bare wood floors. Hang plastic-derived garments to dry after washing them on a gentle cold cycle. "Ugh, we were the original fleece family," Woodruff told me. "It's so great, lightweight, and warm. But it's recycled plastic," so now she's trying to buy wool and denim coats from thrift stores instead.

Then, keep the battleground clean. Wash your hands. Take off your shoes in the house. Use a HEPA filter. The dust bunnies under your bed and the film on your stove vent contain contaminants, so scrub away grease and mop, dust, and vacuum. "I don't want people to think, Oh, I should go out and buy industrial-strength cleaning products," Woodruff said. "Those contain toxic chemicals. You can clean I everything with water and vinegar and baking soda."

I began to put her recommendations to use. I bought a metal filter to make my own iced coffee. (Good luck finding an automatic coffee maker without plastic in it.) I started hang-drying a lot of the household's laundry and decided to try to buy natural-fiber clothing going forward.

Another point Woodruff made stuck in my head. "People say the dose makes the poison, and that's fine if you are a healthy adult," she said. "But there's a range of how

susceptible people are." People who are pregnant, people with preexisting health conditions, people who work in industrial environments, people who live in polluted neighborhoods, and children are most vulnerable to the "insult" of plastic chemicals.

I turned my attention to my kids. Sheets and blankets are important because you breathe so close to the fibers for so many hours. I replaced my younger son's with natural I alternatives. Then I contemplated what to do about my older son, who is obsessed with dragons. A few years ago, I bought him a plastic-fiber duvet cover with dragons on it. I get sweaty looking at it. I needed to get rid of it.

"Why don't I get you a nicer comforter with dragons on it?" I said one evening, trying to be nonchalant. He looked at Ille like I had threatened to send him to an orphanage. "No," he said. The dragons were crucial for the household's safety. "What if I put dragons above your bed, or around your bed?" No. "What if I got dragon toys?" No. We had fought to a draw. I waited a few weeks, bought a soft cotton duvet cover, and threw out the dragon one without telling him, changing the HEPA filter while I was at it. The HEPA filter itself was plastic, I noted while standing in my kids' room, awaiting the tantrum that, thankfully, never materialized.

My boy's chewed-up stuffies were plastic. Their closet was filled with plastic clothes, their shelves stuffed with plastic-coated books, their backpacks and lunch boxes formed from plastic. That night, I dreamed about plastic. I was back in the hospital where I had given birth for the first time, sitting in a plastic wheelchair in the NICU, eating ice chips out of a plastic jug and absorbing plastic stitches into my skin. I took my older son, tiny enough to slip into a pint glass, out of a plastic box where he was being fed by a plastic tube and oxygenated by a plastic cannula.

My anxiety about myself was really about my children - about them growing up in a world where all the objects around them seem bound to hurt them, where too many corporations fight to pad their profits and hide the evidence, where problems are solved by individual action rather than collective responsibility. Until our government acts to protect us, we are both the home chef using the Teflon pan and the budgie choking on the fumes.

Throwing the pans out seemed, for now, like the least I could do. And the most I could do, too.

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