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The 'Forever Chemicals' in Our Water

PFAS compounds are used in thousands of products — and have been linked to numerous health risks. Should we be worried?

Source: TheWeek.com, September 16, 2023

What are 'forever chemicals'?

As their nickname suggests, per- and polyfluoroalkyl substances (PFAS) are a class of hardy man-made compounds that can take hundreds or even thousands of years to break down. Introduced in the 1950s by chemical giants DuPont and 3M, PFAS resist water, oil, corrosion, and heat, making them useful for myriad home and industrial needs. They're the reason bacon slides off a Teflon-coated frying pan, rain bounces off a Scotchgard-sprayed shoe, and burger boxes don't absorb grease. But forever chemicals aren't simply found in the products we use. These compounds have seeped into our soil and drinking water, and are now present in the food we eat and the dust particles we inhale. "We're really seeing PFAS absolutely everywhere," said Elsie M. Sunderland, an environmental chemist at Harvard University. Federal studies show that about 98% of Americans have PFAS in their blood; some of those compounds can take years to leave the body. Scientists are now uncovering links between these ubiquitous chemicals and a host of health risks — including cancer, liver damage, hormone disruption, and birth defects — leading regulators and lawmakers to try to limit their use.

Are these compounds widely used?

Forever chemicals are almost inescapable in modern life. They're used in stain-resistant carpets and furniture, in nail polish, raincoats, sanitary pads and tampons, paint, mascara, camping gear, sunscreen, toilet paper, and Post-It Notes. PFAS-based firefighting foam — which is up to 10% forever chemicals by weight — has for decades been deployed at refineries, airports and military bases to extinguish oil-based blazes. The groundwater around at least 385 military bases nationwide is now contaminated with forever chemicals, according to a report from the nonprofit Environmental Working Group. "If you are relying on well water and are near one of these bases," said Scott Faber, a senior vice president at EWG, "you should be concerned." And PFAS are present in water far beyond those locations. A recent U.S. Geological Survey study found the chemicals in nearly half the nation's tap water; at every site where PFAS were detected, levels were above the health advisory range recommended by the Environmental Protection Agency.

What are PFAS' health effects?

They appear to be vast, although conducting clinical trials to examine the long-term toxicity of PFAS exposure would be impractical and unethical. A 2012 study funded by DuPont as part of a legal settlement examined whether the local community near a West Virginia Teflon factory had been harmed by decades of dumping PFAS-laden waste into the Ohio River. It found a "probable link" between one compound and high cholesterol, ulcerative colitis, thyroid disease, testicular cancer, kidney cancer, and pregnancy-induced hypertension. Other studies have found that exposure to PFAS can weaken the immune systems of children — reducing the number of antibodies they generate after receiving a vaccination — and that children are at a higher risk of obesity in later life if their mothers were exposed to certain forever chemicals during pregnancy.

Why might PFAS be harmful?

Because there are more than 12,000 types of forever chemicals, scientists don't yet have a definitive answer. But studies suggest some PFAS molecules bind easily to a major blood protein, then circulate throughout the body to organs and other tissues. Cells let some PFAS molecules through their outer walls because the chemicals look like the fatty acids they burn for fuel. Once inside cells, PFAS have been shown to cause structural damage linked to cancer, diabetes, and cardiovascular disease. Forever chemicals seem to build up especially in the liver; experiments on rodents have shown that PFAS can boost the risk of nonalcoholic fatty liver disease. Notably, that condition has soared among Americans in recent decades. While it may be impossible to pin a single individual's illness on forever chemicals, "I have not seen a PFAS tested for toxicity that's not toxic," said Scott Belcher, a PFAS expert at North Carolina State University.

What's being done to tackle the health risks?

Lawsuits and fear of litigation are pushing some manufacturers and major PFAS users to clean up and reduce their use of forever chemicals. In August, 3M reached a \$10.3 billion settlement with a group of public water providers over claims its firefighting foams contaminated groundwater; the fund will be used to test and treat water supplies across the country. The company, which admits no wrongdoing, has pledged to end production of all PFAS by 2025. Restaurant chains such as McDonald's, Burger King, and Chick-fil-A have made commitments in recent years to phase out PFAS in their food packaging. The EPA has also proposed new rules to limit levels of the two most common PFAS in drinking water and wants those compounds designated as hazardous substances — a change that could force companies to spend up to \$22 billion scrubbing the most heavily polluted U.S. sites. "Global warming aside, this is probably the most expensive environmental problem we're ever going to face," said Graham Peaslee, a nuclear chemist at the University of Notre Dame. "We are going to have to get inventive on how to filter it out for all of our days."

How to limit PFAS exposure

Short of living inside a PFAS-free bubble, it's effectively impossible to avoid forever chemicals. But experts say there are some measures that can mitigate exposure, such as dusting and vacuuming frequently, using air purifiers, avoiding stain- or water-resistant carpets and fabrics, and getting rid of old nonstick cookware, especially if it's scratched. Makeup products marketed as "waterproof," "long-lasting," or "wear-resistant" should be avoided, as they are more likely to contain PFAS. About 70% of PFAS contaminants can be removed from drinking water with an activated carbon filter, while a reverse-osmosis filtration system — which can cost thousands of dollars — will sift out up to 90% of forever chemicals. Individuals can get their blood tested for certain types of PFAS, but if a person is asymptomatic, there's really nothing a medical provider can do with that information. "In the short term, it's helpful to know some steps people can take" to reduce exposure, said PFAS researcher Laurel Schaidler of Silent Spring Institute. But the solution will need to come from changes made by corporations and officials, she said, not consumers.

Possible Response Questions

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