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In support of: HB1190 - Pesticides - PFAS Chemicals - Prohibition
Before the House Health and Government Operations Committee

Dear Chair Pena-Melnyk and members of the committee:

I am a toxicologist and microbiologist by training and as the former director of the National Institute for Environmental Health Sciences, as well as the National Toxicology Program, positions I held from January 2009 until October 2019, I have been one of the scientists sounding the alarm on PFAS—known as the "forever chemicals"—and have been engaged in efforts with other scientists and public health experts to address the serious health concerns related to PFAS. I also worked for the EPA for 19 years prior to my work at NIEHS and NTP, directing the largest division focused on environmental health research. My research has focused on the health impacts of environmental chemicals. I have been granted NIH scientist emeritus status and am a Scholar in Residence At the Nicholas School of the Environment of Duke University.

The widely accepted Organization for Economic Cooperation and Development (OECD) definition of PFAS is considered the scientific definition, accepted by 37 nations including the US. It is very similar to how PFAS is defined in 22 states, the Dept. of Defense, and Congress, which all align with Maryland's definition. You may hear accounts that EPA's Office of Toxics has a 'working' definition that would reduce the 15,000+ PFAS to 6,000. This does not mean that more than half of the PFAS are no longer classified as PFAS. EPA allows its programs to define PFAS relative to distinct scopes of work within EPA. EPA's CompTox Chemicals Dashboard, a key tool in EPA's PFAS Analytic Tools clearly identifies over 15,000 chemicals as PFAS, including these 66 pesticide active ingredients.

Many of the 15,000+ PFAS are not intended products but are produced while making the products or during the lifecycle of products. For example, many polymers have PFAS as sidechains, which break off during use, reintroducing monomers like PFOA or PFOS into the environment. Raw materials such as the fluorotelomers, trichloroethylene, and PFASs are used to produced surfactants like AFFF and Teflon and side chain polymers. These can lead to transient degradation intermediates and then to PFAAs (e.g., PFOA, PFOS) as terminal degradation products. All of the breakdown products are still PFAS, unless complete demineralization has occurred. And the terminal PFAAs are often more toxic than the precursors used. **Put simply, many chemicals break down into other chemicals. PFAS break down into other PFAS products which are often more toxic and persistent than the original PFAS that were intentionally produced.**

Many PFAS are fluorinated polymers which can breakdown and release monomer PFAS with unmeasurable half-lives, therefore earning the distinction of being considered forever chemicals. The contaminants known as PFAS cause multiple health problems… I definitively say "cause" instead of "are linked". While thousands of scholarly articles have linked the chemicals to a plethora of health effects, I believe we can currently say there is sufficient evidence for causation of adverse impacts as opposed to linkage to our health.

While I was leading the NIEHS, one of the Institutes of the National Institutes of Health, whose mission is to discover how the environment affects people in order to promote healthier lives, I was not allowed to use the word "cause" when referring to the health effects from PFAS or other chemicals. If I was talking about human data or impacts on people, I had to always say there was an association with a laundry list of effects. This was because there are no double-blind, placebo controlled clinical trials for PFAS. It would be unethical to intentionally expose people to chemicals of great concern.

Association, the coincidence of a chemical exposure and disease, and causation, in which a health problem happens *as the result* of the exposure, are different. Because many factors, including chance and genetics and exposures to other substances, can influence the development of disease, the term "cause" is used cautiously in the field of environmental health.

But I have studied PFAS compounds for decades and believe the global contaminants have cleared that high bar. In my mind, PFAS cause health effects because you have the same kind of effects reported in multiple studies in multiple populations. You have longitudinal studies showing the same effects in multiple populations done by multiple investigators and you have animal models showing the same impact.

That is pretty good evidence that PFAS or certain PFAS can cause health effects in people. It is not as strong for every effect, but there are quite many effects where they're strong enough to say "caused," in particular to the relationship between these chemicals and immune system effects, kidney cancer, and elevated cholesterol in humans—the data is very clear.

And given the current ongoing pandemic, it's important to note that PFAS reduces our antibody response to vaccines and that elevated PFAS levels are associated with Covid-19 susceptibility and with an increased risk of a more severe course of COVID-19.

A striking feature of PFAS is how they can cause harm to so many systems within our bodies—our livers, our kidneys, our immunity, our metabolism. Other health issues caused by PFAS include elevated cholesterol levels, liver dysfunction, weight gain, reproductive problems, and kidney cancer, which have been shown to increase along with the levels of the chemicals in blood.

PFAS also increases asthma in children, during pregnancy can impact the health of the mother and her child, can cause poor executive functioning, ulcerative colitis, high cholesterol, thyroid disruption, prostate and ovarian cancer, lower birth weight and size, delayed puberty, early menopause and more.

Concerns about PFAS have existed since the 1960's

PFAS has been of great concern to me and many other scientists around the globe for decades. PFAS-exposure related health concerns began in the 1960s starting with DuPont raising concerns re: health risks of PFAS in an internal 1962 document—fast forward to 1978 when an unpublished study shows adverse effects of PFOA in monkeys, then in 1980 PFAS was detected in serum of workers, in 1981 concerns arose about birth defects in children born to women workers, in 1987 PFOA was shown to cause cancer in a rat study, and later on in 1998, samples from U.S. blood donors in the general population were shown to contain PFAS.

In 2000, PFOA and PFOS were detected in nearly 100% of Americans and 3M announced plans to phase-out PFOA and PFOS. In 2004, DuPont settled a class action suit (>80,000 plaintiffs) for $343 million. In 2006, EPA invited 8 major company producers to phase out PFOA by 2015**.** In 2012, immune system effects related to PFAS were reported in children.

EPA released a statement December 20, 2021 announcing a nationwide monitoring effort for 29 per- and polyfluoroalkyl substances (PFAS) in drinking water. The Fifth Unregulated Contaminant Monitoring Rule (UCMR5) will provide data on the frequency and magnitude at which these chemicals are found in the nation's drinking water systems and will improve EPA's ability to conduct state and regional assessments of contamination.

As you will also hear from other experts, the current total **number of PFAS is more than 14,000 chemicals—that includes** PFOS, PFOA, PFHxS, PFMOAA, GenX, ADONA, Nafion Byproduct 2, etc.—these compounds are environmentally persistent, mobile, and bio-accumulative.

Production of many products, including certain pesticides, involves the addition of PFAS additives, as either active or inert ingredients. The chart below shows you the diverse range of products found to contain PFAS:

We need to turn off the tap on this source of PFAS, until that day arrives, we need at least, to promote alternatives to known PFAS pesticides, and affect changes wherever possible. Given that 14,000 pesticides are registered in Maryland, and are used widely across the state, and given a currently unknown percent of them contain or are contaminated with PFAS, it behooves the state to at least ban these known EPA-identified PFAS active ingredient pesticides.

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Turning off the tap of known PFAS-containing pesticides, is a critical step forward, given how frequently Maryland residents and communities are exposed daily to potentially PFAS-contaminated food and throughout the year to mosquito control products, lawn care, and agricultural pesticides. To help protect future generations, we need comprehensive state policies to end unnecessary uses of PFAS prior to EPA setting federal policies. While the EPA is working to address PFAS, we cannot continue to wait for needed federal regulations. States like Maryland need to protect their residents from this source of needless and often repeated PFAS exposure. And states are leading the way… for example, Maine adopted a state law banning all intentionally added PFAS in products unless the use is deemed unavoidable. Pesticides do not require the use of PFAS as either inert or active ingredients.

I urge this committee to take a crucial simple step in protecting Marylanders by passing HB1190.