POLYFLUOROALKYL SUBSTANCES (PFAS)
or "FOREVER CHEMICALS"
By Bill Vosburgh

The aptly nicknamed "Forever Chemicals" represent a threat to all of us. Detectable levels of these compounds can be found in nearly everyone's blood. Over 2,000 of these compounds were developed to make our lives easier before issues of toxicity arose. Developed in the 1930's, Teflon or poly-tetra-fluoro-ethylene (PFTE) was among the first of this class and used on nonstick cookware. Teflon itself is not toxic unless overheated, yet the manufacturing process created many dangerous byproducts that were let loose into rivers as waste. Real life insights can be found in the movie Dark Waters (2019). It covers the litigation in West Virginia by workers and residents suffering serious illness from poly-fluoro-octanoic acid (PFOA or C8) used in the production of Teflon. Since 2013, PFOA has not been used in its manufacture in the USA.
(https://www.healthline.com/nutrition/nonstick-cookware-safety)

The chemistry of these compounds is the basis of their functional success for consumer products as well as their scourge upon the environment. Long chain carbon molecules with fluorine atoms instead of hydrogen create strong chemical bonds that give hydrophobic (water shedding) properties to these products. Very slippery industrial coatings, fabric treatments, nonstick kitchenware, and firefighting foams are among the uses. However, the strong chemical bonds mean the compounds almost never break down, and accumulate in ground water, soils and living beings. A good primer on this is https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm

Nondegradable does not necessarily mean inert. Many PFAS compounds appear harmless to people, but others have insidious links to birth defects, endocrine disruption and cancers. These were easily seen in workers exposed to high levels and caused more investigational studies. It has taken years for analytical methods to improve enough to plumb the depths of PFAS toxicity. The federal Environmental Protection Agency advisory level for remediation is at 70 parts per trillion. Yes, not parts per million or billion but as few as 20 parts per trillion in some states' regulations for drinking water. Seventeen states have passed regulatory laws for maximum allowable PFAS in their water while the EPA has not.

With incredibly low recommended levels in drinking water, soils and food, the state of Maryland has not yet passed legislation to set legal PFAS standards. Quite the opposite, only Maryland passed a law allowing their use (April 2020). Our regional problem is mostly sourced at airports and military installations throughout the Maryland watershed. The current main culprit for PFAS pollution is the use of firefighting foam in real or practice events. Residues can gradually spread to streams, ground water and the Chesapeake Bay. (https://www.ewg.org/ interactive-maps/pfas_contamination/map/)

Once people are no longer exposed to these chemicals blood levels slowly decline. Stopping the production and use of PFAS compounds, and the remediation of contaminated sites may be

exceedingly difficult and expensive. The contamination of aquifers by runoff, uncapped wells or even intentional aquifer recharge leaves us no clear path to prevent a serious long-term event. There may be an increased dependence on municipal and home water purification systems. Activated charcoal filtration will trap these compounds and may be the only low-cost alternative. Like the asbestos debacle, the litigation is already gearing up. The EPA and Maryland Department of the Environment need to step up to solve this with more studies, guidance and legislation. The problem is not just nationwide but global and it won't just go away.