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PFAS: Man-Made Contaminant the "Forever Chemical"

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Per- and Polyfluoroalkyl Substances (PFAS), once used in everything from dental floss to microwave popcorn bags, are now being recognized as threatening toxic chemicals that pose health risks to populations across the country. PFAS are man-made fluorinated chemical compounds found in a vast array of commercial and consumer products. PFAS contaminants have been found in drinking water nationwide, exposing virtually everyone to some level of exposure. The U.S. government has reported that 98% of the population has detectable levels of PFAS in their blood. Of major concern, a result of one of the chemical properties of PFAS is that they are nearly impervious to biological or chemical degradation and therefore, unless treated, will remain in the soil and groundwater indefinitely, which has led to their nickname "forever chemical".

Introduced in the 1940s, thousands of classes of PFAS were used in commercial products to protect against heat, grease, stains, chemicals and corrosion. Applications include such everyday consumer products as non-stick cookware, waterproof clothing and dry cleaned textiles, stain resistant carpets and cleaners, dental treatments and even food packaging such as popcorn bags and pizza boxes. Another significant use of PFAS is in the production of firefighting foams manufactured for major airports, industrial facilities and military installations. Over the past several years, leading industrial manufactures have voluntarily ceased production of PFAS products or have changed chemical formulas to other types of perfluorinated compounds. Many airport-based fire training facilities and military bases, however, have no immediate plans to ban PFAS firefighting foam applications needed to extinguish petroleum and/or gas/diesel fuel fires.

Another source of these chemicals in the environment arises from disposed products in landfills as they settle and breakdown and leach into ground water impacting eco-systems, as well as municipal sources of drinking water. Adverse health risks have been associated with high blood pressure, high cholesterol, ulcerative colitis, obesity and certain cancers although experts warn that it is difficult to scientifically link medical conditions directly related to digestion of tainted drinking water or food. As of 2018, there were "172 documented PFAS contamination sites across 40 states, exposing millions of residents," according to the non-profit organization Food & Water Watch. Yet, there is not an enforceable federal standard for PFAS in drinking water in the U.S. In 2016, the Environmental Protection Agency (EPA) issued an updated Health Advisory setting voluntary guideline limits for drinking water that is unsafe for digestion. The new advisory guideline is set at 70 parts per trillion (ppt) for PFOA/PFOS (two of the most prevalent and studied PFAS compounds); typically drinking water standards are in parts per billion (ppb).

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In the absence of a federal enforceable Maximum Contaminant Level (MCL), individual states are taking the initiative to implement safe drinking water standards that are much stricter than the current federal health advisory guidelines. New Jersey has the most stringent standard thus far with a standard set at 13ppt. More recently, New York announced its proposal to revisit unsafe limits and to invest in projects to "assist municipalities in treating these emerging contaminants." Connecticut has formed a work group to study PFAS issues for developing a plan of action in the absence of federal regulations governing exposure. California, as another example, will be testing landfills and airports throughout the state.

Environmental PFAS exposure could become a long-tail risk, not unlike the asbestos crisis of the 50s. The "forever chemical" is immune to degradation and some compound characteristics may even increase in concentration over time. Due to the extremely low standards, detection of contamination is a pain staking process as there are a limited number of laboratories equipped to handle testing contamination at such low levels. Further, the associated costs to capture, transport and store the field samples can be prohibitive. New water treatment technologies and remediation systems are being developed and pilot systems installed; however, the long term impact of successful treatment and removal of the contaminants is uncertain.

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