



This is the first in a series of articles, prepared by Chevy Chase citizens using public sources, that address the growing risks associated with artificial turf playing fields. Hazards of excessive heat and increased injury have long been documented. New findings on the extreme toxicity of PFAS in artificial turf call into serious question its continued use. Maret School plans to install nearly four acres of artificial turf for its field development at the Episcopal Center for Children at Utah and Nebraska Avenues.

1. What are PFAS? Why should we care about them?

PFAS are a class of roughly 9,000 chemical compounds. They are all hydrocarbons which share the feature of a Carbon atom bonded to a Fluorine atom. The Carbon-Fluorine bond is extremely hard to break, which is why they are called “forever chemicals.” As a result, they do not break down naturally, over time, like most chemicals do. Instead, they persist in the environment, accumulating in water, soil, plants, and human and animal tissue.

PFAS can repel both water and oil, which makes them very useful in industry. They are perhaps most famously used in the production of Teflon, a role featured in the 2019 film *Dark Waters*, which followed a class action lawsuit brought against DuPont for the cancer deaths of those exposed to these chemicals. Exposure was also linked to severe birth defects in cows, highlighting the effect of these chemicals on fetal development.

PFAS are essential to the production of plastic turf as they keep the molten plastic from sticking as each ‘grass blade’ is extruded through a metal form like a strainer. Industry has kept the components of plastic turf secret, but in 2019 laboratory studies done by the Ecology Center in Ann Arbor, MI proved the presence of PFAS and fluorine (which is indicative of PFAS) in both the plastic blades and the backing of artificial turf. <https://www.ecocenter.org/toxic-forever-chemicals-infest-artificial-turf> Every variety of plastic turf that has been scientifically analyzed has been found to contain PFAS, including those which claimed to be “non-toxic.” According to *The Guardian*, “industry has said the grass blades and backing cannot be made without PFAS.” <https://www.theguardian.com/environment/2022/sep/30/boston-bans-artificial-turf-toxic-forever-chemicals-pfas>

Concerns were raised about PFAS early on, and 3M voluntarily ceased producing one early PFAS, known as PFOS, in 2000. US production of another early favorite, PFOA, was phased out beginning in 2006. Chemical companies have continued to produce “new” PFAS, which they claim are “safer,” but studies

indicate these new compounds share the same risks as earlier formulations and some, like GenX, are actually more harmful. 3M has been dogged by lawsuits concerning the adverse effects of exposure to PFAS, a situation reflected in their plummeting stock value. They just reached a \$10.3 billion settlement to address contamination of local water systems with PFAS, and are halting all PFAS manufacture by 2025.

In a 2020 review article in the scientific journal *Environmental Toxicology & Chemistry*, authors summarized current research on the dangers of PFAS. They stated: "Epidemiological studies have revealed associations between exposure to specific PFAS and a variety of health effects, including altered immune and thyroid function, liver disease, lipid and insulin dysregulation, kidney disease, adverse reproductive and developmental outcomes, and cancer." The difficulty in dealing with PFAS is the proliferation of these compounds. Scientists study one particular PFAS and find it harmful; manufacturers slightly alter the formula and claim the new one is safe. New studies then need to be performed. As the authors explain, new scientific studies are focusing on the fundamental structure of PFAS in order to counter this "whack a mole" situation.

A recent article in *The Philadelphia Inquirer* called attention to the surprisingly high number of Philadelphia Phillies who, having played for years on a plastic turf field at Veterans Stadium, died from a rare and aggressive brain cancer: glioblastoma. Analysis of a piece of turf from Veterans Stadium identified 16 different PFAS. It takes a long time to prove a causal relationship between environmental toxins and cancer.

In the meantime, don't we know enough to make us cautious about needlessly exposing children and their families, and our neighbors, to these chemicals which studies have consistently shown are alarmingly dangerous?

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