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PFCs: Stain-Resistant and Cancer- Causing?

Perfluorinated compounds (PFCs) have been in use for more than 60 years. PFCs are a family of fluorine-containing chemicals with properties to make materials stain- and stick-resistant. Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) were the two most common chemical constituents of PFCs and were used in a wide variety of products. Both have since been phased-out of use in the U.S. Research shows that PFCs are persistent and bio-accumulative, raising serious public health concerns.

Today, companies have replaced PFOS and PFOA with similar PFCs. Very little is known about the safety of these newer fluorine-containing chemicals which are found in everything from cookware to clothing.

Widespread exposure to PFCs

Human exposure to PFCs is widespread. For decades PFCs have been released into the environment from manufacturing facilities, leading to contamination of food and certain water supplies.



A variety of PFCs are applied in water-, soil-, and stain-resistant coatings for clothing and other textiles, grease-resistant coatings for food wrapping materials, and other products, so exposure also occurs through consumer products, house dust and food packaging.

When the Centers for Disease Control measured the concentrations of 11 PFCs, including PFOS and PFOA in 1562 samples collected from a representative U.S. population 12 years of age and older in the 1999-2000 National Health and Nutrition Examination Survey they detected PFOS and PFOA in all the people they tested.

Possible Cancer, Other Health Effects

Evidence from animal studies dating to the late 1970s suggests a possible link between PFCs and cancer. The U.S. EPA issued a draft risk assessment of PFOA in 2005

which stated the evidence was “suggestive” of a cancer risk in humans. A peer review of the EPA’s risk assessment recommended that PFOA be considered “carcinogenic to humans.” For PFOS, the evidence of carcinogenicity is less extensive and less conclusive.



Immunotoxicity effects of PFOA and PFOS have recently been demonstrated. Strong evidence suggests that current exposure levels correlate with adverse effects on certain immune functions. One study, for example, found that PFC concentrations in mothers showed a strong negative correlation with vaccine antibody concentrations in children.

There are also preliminary findings showing that in animal studies, PFOAs caused weight gain and thus could be obesogens.

Ways to limit PFCs exposure

Try to avoid purchasing or using the following:

1. Grease-repellent coatings often found in fast food containers such as microwave popcorn bags and pizza boxes.
2. Stain-resistance treatments. Don’t choose furniture and carpets that are marketed as “stain-resistant,” and don’t apply finishing treatments such as Stainmaster.[®] Where possible, choose alternatives to outerwear and sportswear that has been treated for water or stain resistance.
3. Personal-care products containing ingredients that include the words “fluoro” or “perfluoro.” PFCs can be found in dental floss, nail polish, facial moisturizers, and eye make-up.
4. Non-stick cookware

Current exposure limits are not health-protective

In an article on PFCs published in the November-December 2014 edition of *Public Health Reports*, Drs. Grandjean and Clapp illustrate that existing exposure limits are insufficiently protective, as they are based on outdated evidence. New data gleaned from animal- and population-based control studies – for example, data from approximately 70,000 Ohio and West Virginia residents who were exposed to PFOA via contaminated drinking water– reflect the need for an updated standard. A population-based case control analysis supports the association between PFOA exposure and both kidney and testicular cancer and suggests an association with prostate and ovarian cancer and non-Hodgkin lymphoma. Immunotoxicity effects of PFOA and PFOS have also been demonstrated recently in vitro and in a variety of species and models.

In 2015 the *Madrid Statement* was released documenting scientific consensus that the entire class of PFCs is extremely persistent, potentially toxic, and should be replaced with safer alternatives. Over 200 scientists from 38 countries reached this consensus. The *Madrid Statement* was published in *Environmental Health Perspectives*, a peer-reviewed scientific journal.



Chemical policy implications

The Toxic Substances Control Act (TSCA), the federal law which regulates chemicals, did not require testing of substances already in commerce at the time it was enacted in the late 1970s. Thus, toxicology studies of PFCs were not mandated, creating the situation we have today where exposure to PFCs is widespread and government-required limits may be 1,000-fold too high to protect the public.

The absence of data on the health hazards of a particular chemical does not equal safety; in fact, it could be mean the exact opposite. PFCs illustrate this point perfectly. Rather, the absence of data clearly demonstrates the need for health-protective chemical policy reform -- reform which requires hazard data for all chemicals currently on the market and for any new chemical; allows public access to this chemical data as a means of public safety, and stirs innovation of safer chemicals and products.

Selected References

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