“Determinants of Serum Concentrations of Polyfluoroalkyl Compounds in Young Girls in the Greater Cincinnati and San Francisco Bay Areas”

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ABSTRACT:
Polyfluoroalkyl compounds (PFCs) have been detected in human breast milk which is a major exposure source for lactating infants. Through the NIH Breast Cancer and the Environment Research Program (BCERP), we conducted a study of PFC biomarkers in serum of 6-8 year-old girls in Greater Cincinnati (GC) (N=353) and the San Francisco Bay Area (SFBA) (N=351), with serum collected in 2005-2009. We detected five PFCs in >95% of the girls. Median serum concentrations of both perfluorohexanesulfonate (PFHxS) and perfluorooctanoate (PFOA) were higher in the GC girls than in the SFBA girls (PFHxS 5.2 vs. 2.3 ng/ml, p<0.001; PFOA 7.3 vs. 5.8 ng/ml, p<0.001) but were similar for other PFCs. Correlations of the PFC analytes with each other suggest that a source upriver from GC may have contributed to exposures through drinking water, and water treatment with granular activated carbon filtration resulted in less exposure for SWO girls compared to those in NKY. Mothers self-reported the duration of breast feeding their daughters. In linear regression analyses, with race, education, body mass index, parity and age at sample date as covariates, being breast fed was associated positively with PFC serum concentration in both GC and the SFBA (p<0.01). Duration of breastfeeding also was significantly associated with higher PFOA concentration in girls from both sites, with a significant test for linear trend of β estimates over the increasing duration categories (1-3, 4-6, 7-9, 10-12 and 13+ months) (SGBA p=0.03; GC p<0.0001). PFOA has been characterized as a drinking water contaminant, and water treatment systems effective in removing PFCs will reduce body burdens.
Bio:
Susan M. Pinney, PhD is a Professor in the Department of Environmental Health in the College of Medicine, University of Cincinnati. Dr. Pinney has conducted research in the area of environmental epidemiology for the last 25 years. Her initial studies were in occupational settings, where job history, work zone location and industrial hygiene monitoring data often provide the information needed to do retrospective exposure information. Over the last 20 years, she has applied the methods used in occupational exposure estimation to persons exposed in a community setting. She has measured biomarkers of exposure in multiple studies, as tool to estimate internal exposure. Dr. Pinney has conducted studies incorporating exposure biomarkers of radiation, uranium, cotinine, phenols, phthalates, phytoestrogens, organochlorides, and most recently, the perfluoroalkyl chemicals (PFCs) including perfluorooctanoate (PFOA), and has developed methods for incorporating environmental biomarker measurements into models for estimating exposure.