CROSS SECTIONAL AND LONGITUDINAL ASSOCIATIONS BETWEEN PFOS AND PFOA IN THE MID OHIO VALLEY AND CLINICAL MARKERS OF DISEASE

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Background and Aims: Experimental data and epidemiological studies have suggested potential effects of PFCs, in particular PFOA and PFOS, on a number of clinical markers reflective of or predictive of chronic disease, including lipids, hormones and immune markers. While suggestive, results of cross sectional studies pose difficulties in interpretation due to uncertainties regarding causality. The aim of this presentation is to compare estimates derived from a cross sectional with a nested longitudinal study in the same population.

Methods: In the C8 Science Panel Community Study in the Mid Ohio Valley, associations between clinical markers and PFCs have been investigated in 67,000 participants with individual exposure, biomarker and questionnaire data from 2005-6. Within this population a nested sample of 755 participants was recruited for which clinical markers and PFCs were measured in 2010.Exposure to PFOA had largely stopped at or soon after the first survey and PFOS exposure was also largely reduced. By modeling the change in clinical markers versus change in PFCs, we may test more directly the dependence of biomarkers on PFC levels.

Results: PFOA serum levels in 2005-6 (mean 80 ng/ml) and PFOS (mean 25 ng/ml) were raised in comparison to typical US levels due to contaminated drinking water. Cross sectional analyses indicate significant associations with a number of clinical markers, including serum lipids, which increase with increasing PFOA or PFOS, and serum C Reactive Protein and Immunogobulin A, which fall with increasing PFOA or PFOS. Between the two surveys, the mean fall in PFOA was 54% and in PFOS was 56% (adjusted for age and time). We will also report longitudinal changes in biomarkers.

Conclusions: The collection of longitudinal data is expensive and therefore the nested study was smaller than the cross sectional study, leading to wider confidence intervals. Longitudinal studies address evidence of causality more directly.