

**Status report: Association of perfluorooctanic acid (PFOA) and perfluorooctanesulfonate (PFOS) with uric acid among adults with elevated community exposure to PFOA**

**The C8 Science Panel (Kyle Steenland, Tony Fletcher, David Savitz)**

**January 23, 2009**

This report summarizes the findings relating PFOA (C8) and PFOS (C8S) to levels of uric acid in the serum of the participants in the C8 Health Project, which was carried out in 2005-2006 in the Mid-Ohio Valley. A full report of these findings will be submitted to a peer-reviewed scientific journal.

**Background:** Perfluorooctanoic acid (PFOA, also known as C8) and perfluorooctanesulfonate (PFOS, also known as C8S) are compounds which do not occur in nature but have been widely used in chemical production since WWII, and persist indefinitely in the environment. They are present in the serum of most Americans at median (50<sup>th</sup> percentile) levels of 4 ng/ml (nanogram/milliliter) and 21 ng/ml, respectively, and also present in the serum of residents of many other countries. PFOA has been associated with elevated uric acid in one study of exposed workers, but not previously studied in a general population. Uric acid is a risk factor for hypertension and possibly for other cardiovascular disease.

**Methods:** We conducted a cross sectional study to examine the association between PFOA and PFOS and uric acid in the serum among 55,388 community residents age 18 and older in Ohio and West Virginia, who lived or worked in six water districts contaminated with PFOA from a chemical plant. All these residents participated in the C8 Health Project in 2005-2006. At that time they gave blood, which was used to measure both PFOA and uric acid in the serum (the liquid clear part of the blood after blood cells have been taken out). We compared their levels of uric acid in relation to levels of C8 via multiple regression techniques, while adjusting for other variables which could influence uric acid.

**Results:** The median (50<sup>th</sup> percentile) of uric acid level in the population was 5.5 mg/dl (milligram/deciliter). The median level of PFOA was 30 ng/ml, while the median level of PFOS was 20 ng/ml. Both PFOA and PFOS were significantly associated with increases in uric acid levels, with an increase of 0.2-0.3 mg/dl in uric acid associated with an increase from the lowest to highest decile (each decile represents 10% of the population) of either PFOA or PFOS. The risk of excessive uric acid (defined as >6 mg/dl in women, >6.8mg/dl in men) increased modestly with increasing quartile of each of the two chemicals; the ratios of risk for each quartile

versus the first quartile were 1.00, 1.24 (95% confidence interval 1.16-1.32), 1.34 (95% confidence interval 1.26-1.43), and 1.38 (95% confidence interval 1.30-1.47) for PFOA and 1.00, 1.06 (95% confidence interval 0.99-1.12), 1.17 (95% confidence interval 1.10-1.24), and 1.25 (95% confidence interval 1.17-1.33) for PFOS.

**Conclusion:** Higher serum levels of both PFOA and PFOS were associated with a higher risk of excessive uric acid in the blood. However, because of the fact that uric acid and PFOA/PFOS were measured at the same time, we cannot know if an increase in either PFOA or PFOS would lead to an increase in uric acid. Other possibilities include that both uric acid and these two chemicals increase in relation to some other unknown chemical in the blood, or even that an increase in uric acid in fact causes an increase in PFOA or PFOS for unknown reasons.

Therefore no firm conclusions about a causal relationship between PFOA or PFOS and uric acid can be drawn from these findings.