

INTERIM REPORT

**Epidemiology
Medical Department
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Title: Identification of Fluorochemicals in Sera of American Red Cross Adult Blood Donors

Study

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IRB Approval

Exempt Expedited

Estimated Date of

X

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INTRODUCTION

The distribution of serum perfluorooctanesulfonate (PFOS) and other fluorochemicals among individuals from the general United States population has not been well characterized. In 1997, analysis of pooled blood samples (n = 3 to 6 samples which had 5 to 10 donors in each sample) from 18 blood banks in the United States resulted in a mean geometric mean of 28.2 parts per billion (ppb) of PFOS in the serum with a range from 15.9 to 51.5 ppb for the individual means from the 18 blood banks (3M Company, 1999).

In order to develop a better understanding of the serum fluorochemical distribution in the U.S. adult general population, the 3M Company, in conjunction with six American Red Cross blood banks, has obtained blood samples from more than 600 adult donors. The purpose of this report is to provide preliminary data regarding the findings from this research endeavor.

METHODS

Through arrangements with six American Red Cross blood banks, we obtained serum samples from 652 adult donors which represented the following geographical locations:

- 1) southern California (Los Angeles);
- 2) upper midwest (Minneapolis-St. Paul, MN);
- 3) southeast (Charlotte, N.C.);
- 4) northeast (Boston, MA);
- 5) northwest (Portland, OR); and

6) mid-atlantic (Hagerstown, MD)

Northwest Bioanalytical Inc. (Salt Lake City, Utah) analyzed 7 serum fluorochemicals using high pressure liquid chromatography/electrospray tandem mass spectrometry (HPLC/ESMSMS) and evaluated versus an extracted curve (Hansen et al, 2001). The seven analytes were: perfluorocotanesulfonate (PFOS); perfluorooxanesulfonate (PFHS); perfluorooctanoate (PFOA); N-ethyl perfluorooctanesulfonamidoacetate (PFOSAA); N-methyl perfluorooctanesulfonamidoacetate (M570); perfluorooctanesulfonamidoacetate (M556); and perfluorooctanesulfonamide (PFOSA).

RESULTS

Provided in Table 1 are the summary mean, median, geometric mean, range and 95% cumulative percentile for each of the seven fluorochemicals for the 652 blood donors. Additional statistical analyses are currently being done to examine the central tendency and distribution of the data by age, gender, location and their respective interaction terms. A reliability assessment, which examined split samples from a subset of the donors, is also being analyzed.

DISCUSSION

The findings in Table 1 must be viewed cautiously and only as preliminary data until a final report is issued. These data and statistical analyses have not completed quality assurance procedures. At this time, these preliminary results suggest that the

mean serum PFOS level approximates 40 ppb in these 652 adult donors although whether this varies by location, age, gender and their interactions is still under investigation. It is anticipated that a final report will be issued later in 2001.

REFERENCES

3M Company (1999). Perfluorooctane Sulfonate: Current Summary of Human Sera, Health and Toxicology Data. February 5, 1999 (unpublished report).

Hansen KJ, Clemen LA, Ellefson ME, Johnson HO (2001). Compound-specific quantitative characterization of organic fluorochemicals in biological matrices. *Environ Sci Technol* 35:766-770.

Table 1
Preliminary Descriptive Summary of Serum Fluorochemical Levels (ppb)
in Adult American Red Cross Blood Donors

Analyte	Mean*	Range	Median	Geometric Mean*	Cumulative 95 th Percentile
PFOS	43.7	<LLOQ-1656	35.8	35.1	90.5
PFOA	5.6	<LLOQ-52.3	4.7	4.6	12.9
PFHS	2.9	<LLOQ-66.3	1.6	2.0	9.6
PFOSAA	3.0	<LLOQ-60.1	1.4	2.0	7.6
M570	1.8	<LLOQ-19.0	0.9	1.4	5.3
PFOSA	<LLOQ	<LLOQ	< LLOQ	<LLOQ	<LLOQ
M556	<LLOQ**	<LLOQ-12.9	<LLOQ	<LLOQ	<LLOQ

*Values that are < LLOQ were analyzed as the midpoint between zero and the <LLOQ

** Mean for M556 was <LLOQ. However, there were 13 individuals who had M556 values greater than LLOQ. These > LLOQ 13 values for M556 ranged from 3.58 to 12.90 ppb. Their mean was 7.41 ppb.

#The method acceptance criteria states the concentration found for each QC must be within +/- 20% (+/- 25% for PFOSA and PFOSAA) of the target concentration. The statistical error of any individual result may exceed the QC acceptance criteria.

PFOS < LLOQ = (4.27)

PFOA <LLOQ = (1.92) or (2.11).

PFHS <LLOQ = (1.36) or (2.09) There were 16 individuals yet to have QC results reported.

PFOSAA <LLOQ = (1.60) or (2.80)

M570 <LLOQ = (1.00) or (1.80) There were 16 individuals yet to have QC results reported.

PFOSA <LLOQ = (1.00) or (1.40)

M556 <LLOQ = (2.50) or (3.20)