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**Results to Date from the
PFOA Worker Health Study
January 11, 2005**

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Results to Date from the PFOA Worker Health Study

**Ammonium Perfluorooctanoate:
Cross-Sectional Surveillance of Clinical
Measures of General Health Status
Related to a Serum Biomarker of
Exposure and Retrospective Cohort
Analyses in a Polymer Production
Plant**

Summary

To date, there are no human health effects known to be caused by PFOA; several statistical observations merit further study.

- Statistically significant associations are seen with serum PFOA levels and some serum lipid fractions, uric acid, and iron.
- These associations were only seen in those study participants with the highest serum PFOA levels, which were equal to or greater than 1000 ppb.
- DuPont, in collaboration with outside experts, is committed to conducting the studies that are necessary to understand the significance of these observations.

Purpose of Study

Phase 1 Cross- Sectional Survey:

Determine if there is a relationship of serum PFOA levels in current employees with respect to medical test results

Phase 2 Historical Mortality Study:

Determine if there is a relationship of past exposures to PFOA and any changes in frequencies and causes of mortality

General Methods—Phase 1

Cross-Sectional Survey

Voluntary participation across all areas of the plant

Cross-sectional design, that is, “snapshot” of both the exposure marker and the health outcome variables based on complete physical exam and clinical chemistries

Exposure groups, by deciles, used to compare lowest to highest groups based on serum PFOA levels

Statistical analyses for modeling relationships

Status—Phase 1 Cross-Sectional Survey

1,024 employees participated in the cross-sectional health survey

- **All participants have received their individual serum PFOA levels and medical test results.**
- **About 60 parameters have been analyzed to date.**

Not all of the questionnaire data have been analyzed, but these analyses are underway.

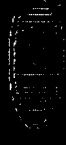
General Methods—Phase 2

Historical Mortality Study

Historical study of all causes of death among employees of Washington Works employees

- **Covers period of about 50 years**
- **Compares frequencies and causes to U.S. national rates, West Virginia populations and the rest of U.S. DuPont**
- **Takes into account estimates of past exposures to PFOA**

Study is in progress.



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Serum PFOA Levels By Work Assignment

Work Assignment	Serum PFOA (ppb)			
	Number in Group	Median	Min	Max
Works in PFOA areas	259	490	17	9550
Previously worked in PFOA areas	264	200	9	2590
Occasionally works in PFOA areas	160	180	8	2070
Never assigned to PFOA areas	342	110	5	963
Total Participants	1025			

General Findings

Nearly all of the parameters measured were within normal reference ranges and not associated with serum PFOA levels:

- No correlation with liver function tests
- No correlation with blood counts
- No correlation with any cancer markers measured—prostate, leukemia, multiple myeloma

General Findings

Statistically significant but modest increases in some cholesterol fractions (total, LDL) and triglycerides at the highest concentrations of serum PFOA.

Statistically significant but modest increases in uric acid and iron at the highest concentrations of serum PFOA.

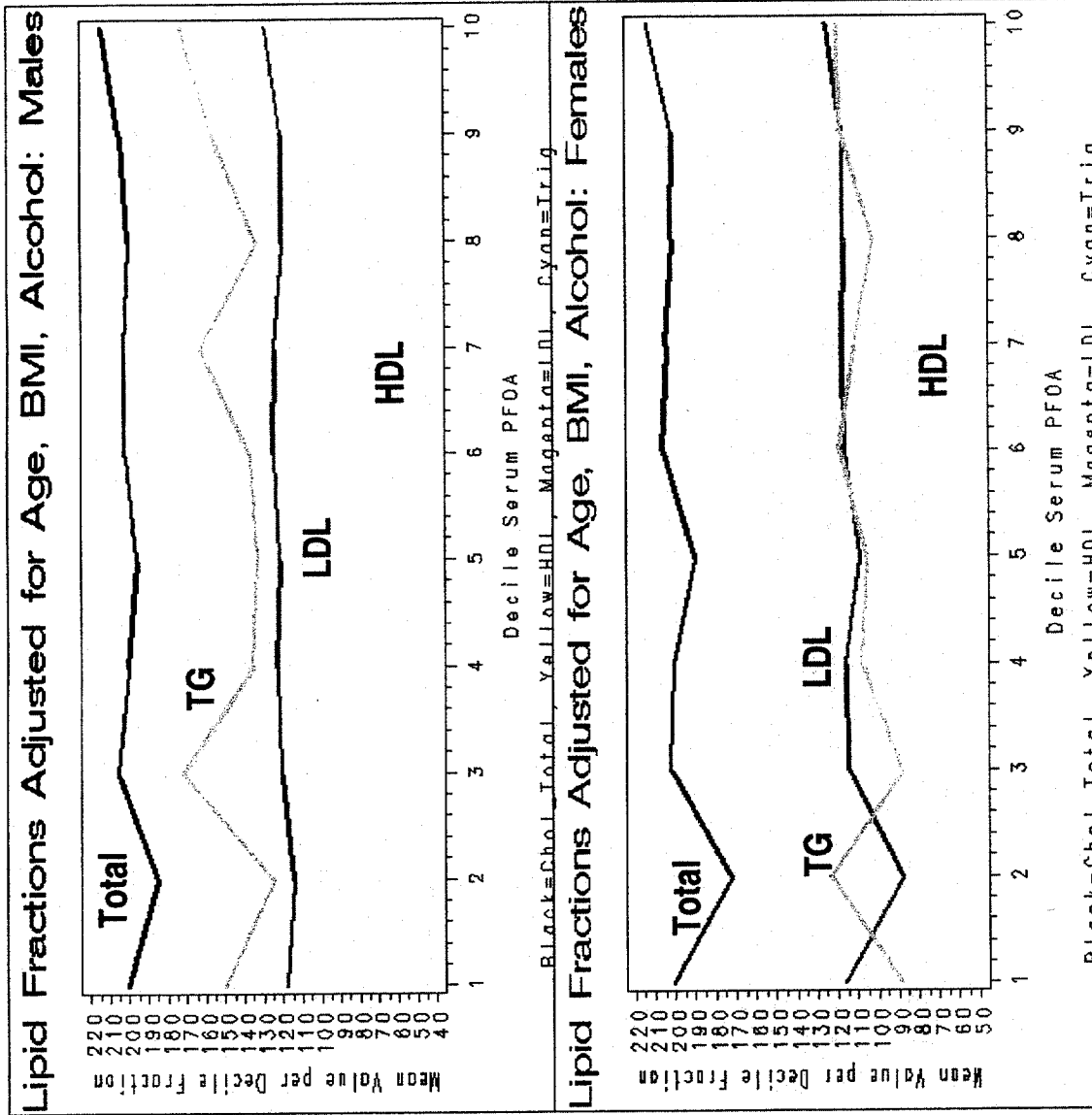
Notably, “good” cholesterol (HDL) was unaffected by serum PFOA levels.

CRP levels (C-reactive protein, a possible risk factor for heart disease) were unaffected by serum PFOA levels.





Mean adjusted lipid values for serum PFOA levels indicate a modest increase in highest decile (>1000 ppb)



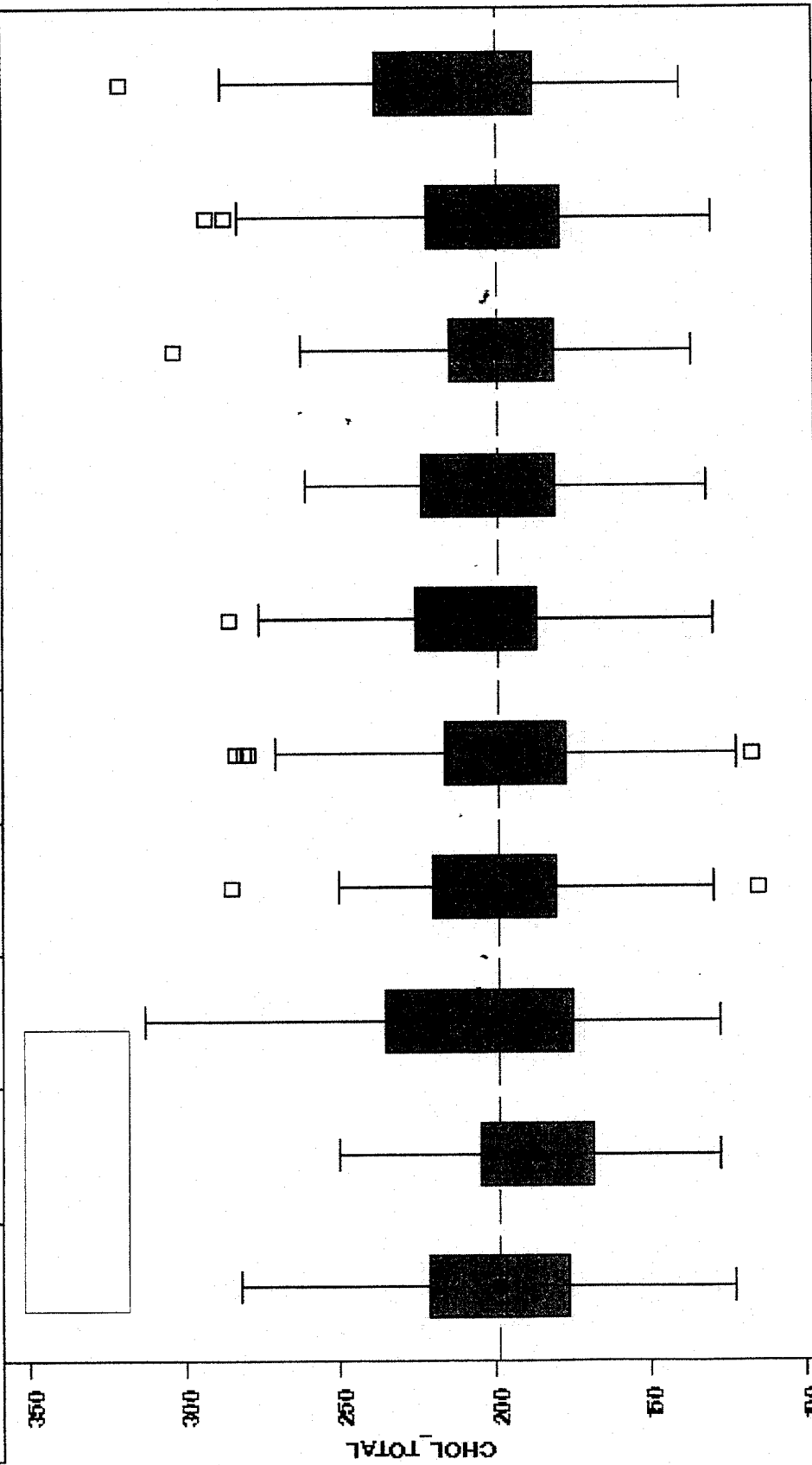
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CHOL_TOTAL by PFOA Quantile

Sex=M, Heartmeds=N, MW 2004

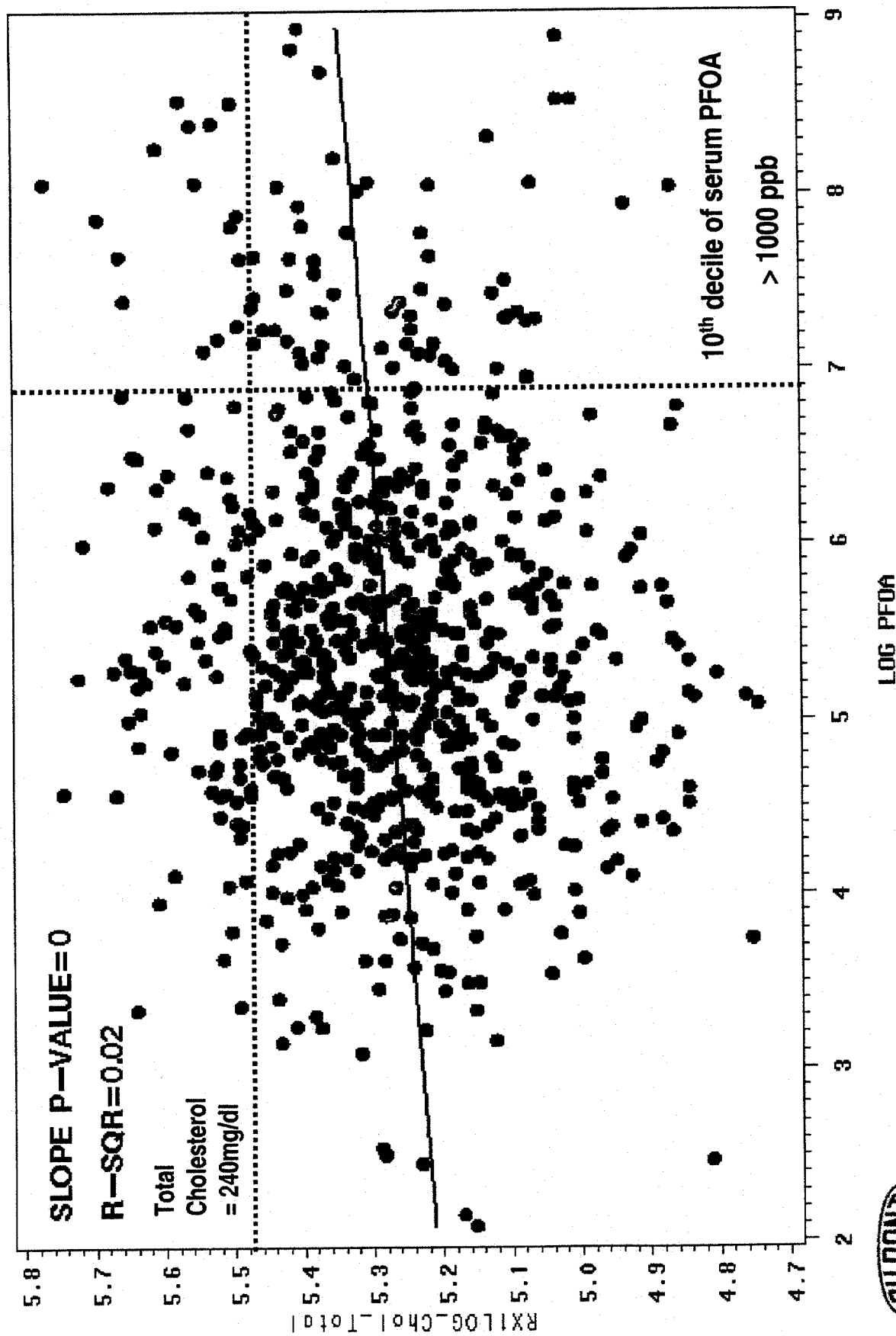
Mean	198.823	187.016	205.629	199.857	196.306	204.635	200.871	198.873	206.097	214.587
Std Dev	32.345	28.787	39.434	31.089	37.476	32.835	30.472	31.022	36.740	36.646



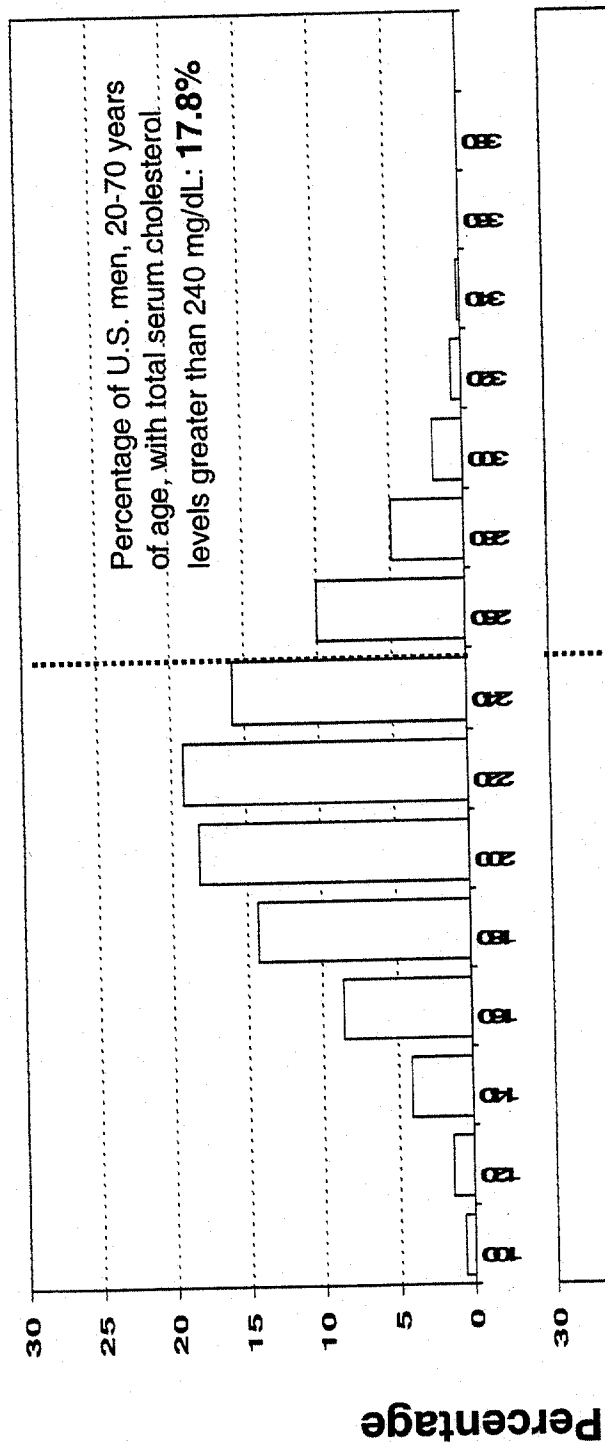
Deciles

LOG Chol Total vs LOG_PFOA : WW 2004, Terms=LogPFOA ALO6

Where Sex=M, Heartmeds=8



Overall Comparison of Male Washington Works Study Participants with the General US Population



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Plans for Further Work

DuPont Medical, Epidemiology and Toxicology will work with medical and other scientific experts to design studies to answer remaining questions:

Are these observations reproducible?

Are similar associations seen in other worker populations?

Is there a cause and effect?

Is there a biological basis for these associations?



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Implications of Study Beyond Plant

Not a general public health issue:

- . Associations were only seen in an occupational setting.
- . PFOA levels in general public extremely low.

Not a consumer health issue:

- . DuPont research has demonstrated that no detectable serum PFOA levels would result from the use of consumer articles made with DuPont products

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2004 Progress Report Reduction of C8 Emissions & Discharges at DuPont Washington Works

Emissions Reduction

2004 Progress Report
Reduction of C8 Emissions & Discharges at
DuPont Washington Works

	1999	2004 YE	Reduction
Air	31209	185	99.4%
Water	55597	1542	97.2%
Total	86806	1727	98.0%



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Emissions and Exposure Reduction

- More than \$21.5 million invested since 1988; another \$6.2 million planned by 2006.
- DuPont is making recovery/recycle technology available to competitors.

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*Questions and Answers***

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**Robert W. Rickard, Ph.D., Science Director
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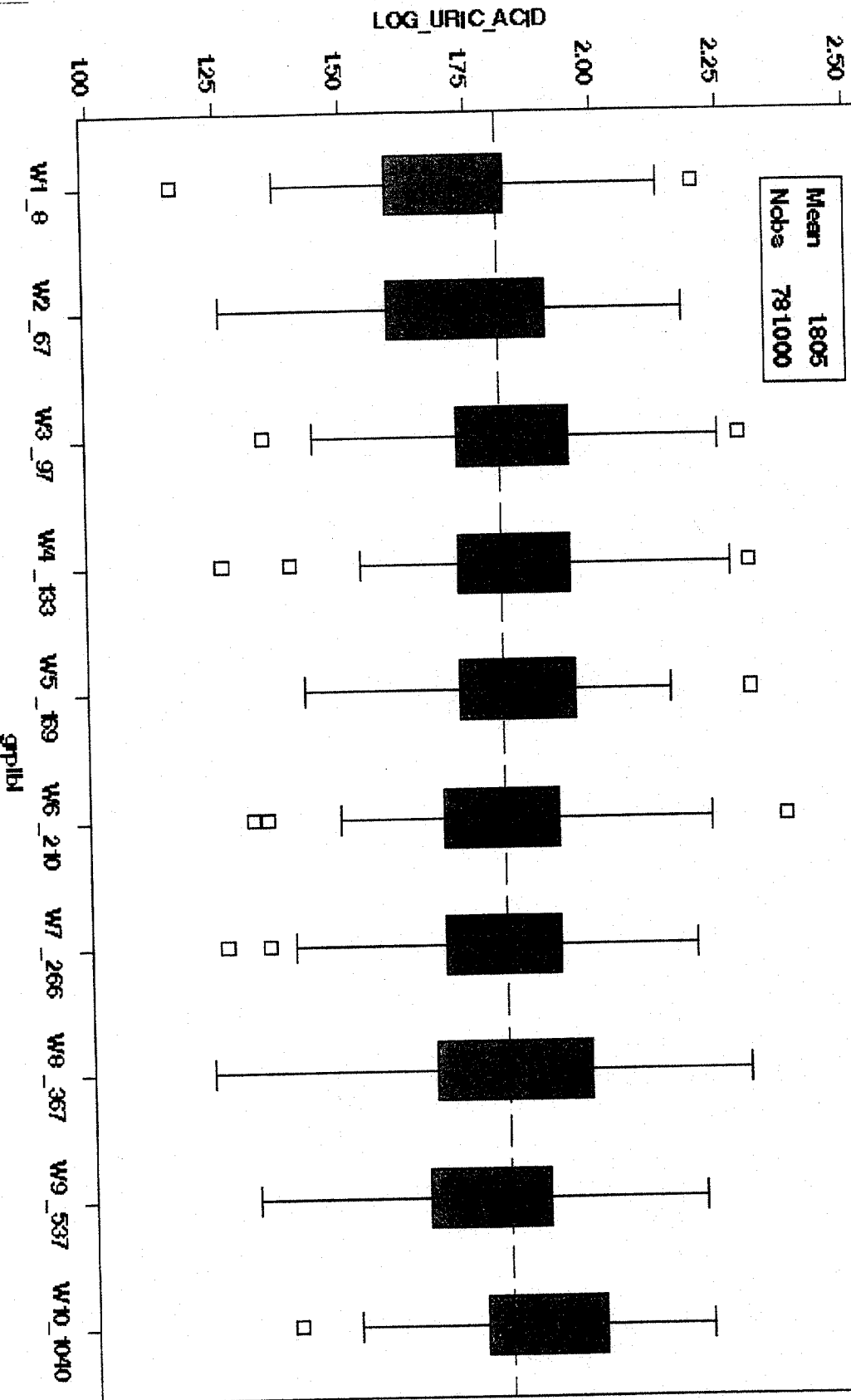
Sol E. Sax, MD, Chief Medical Officer



URIC ACID by PFOA Quantile

Sex=M, Hear tmeds=B, MM 2004

Mean	1.735	1.755	1.822	1.828	1.820	1.805	1.810	1.816	1.777	1.875
Std Dev	0.198	0.209	0.179	0.183	0.177	0.189	0.205	0.205	0.180	0.178



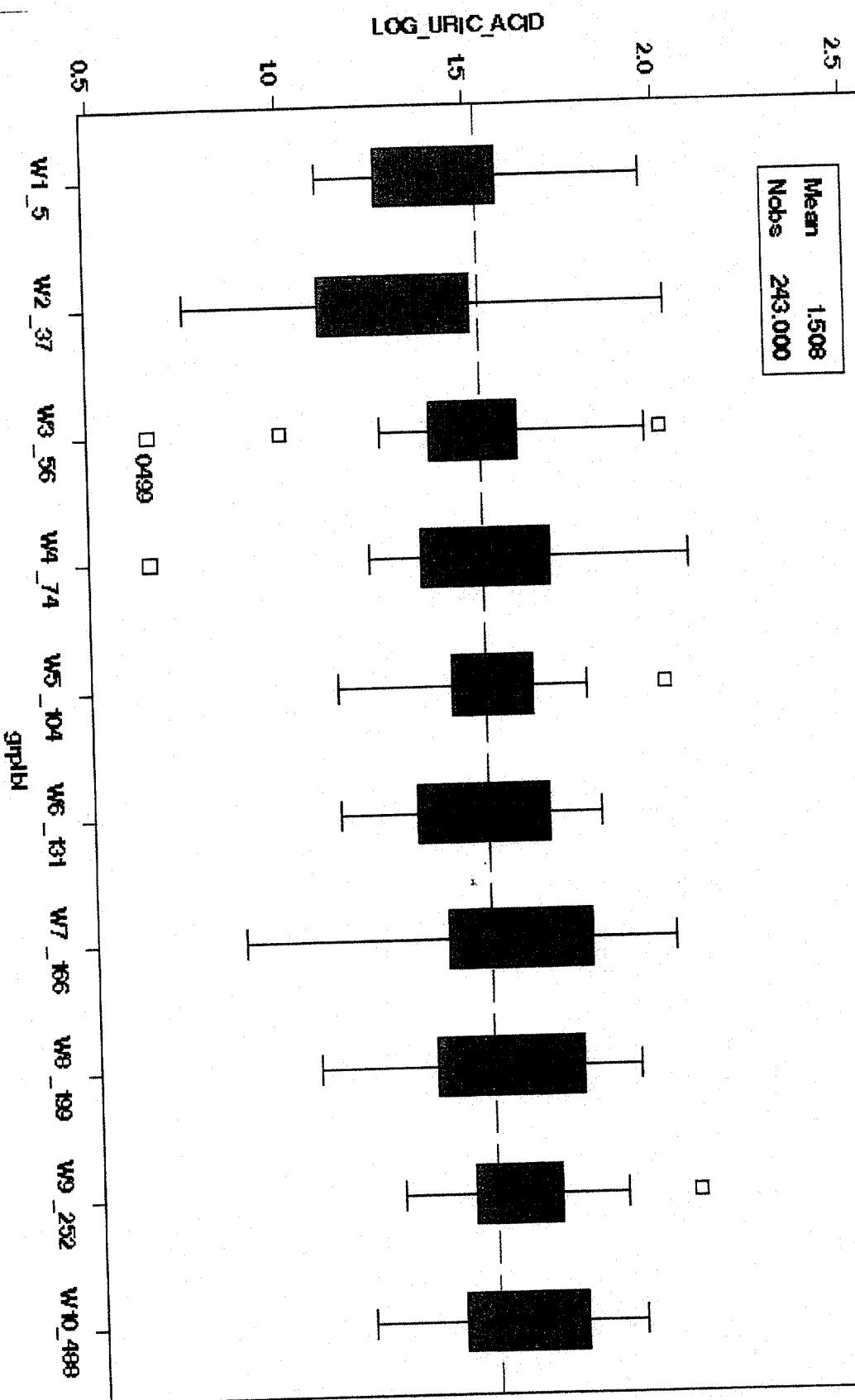


URIC ACID by PFOA Quantile

Sex=F, Heartmeds=B, WM 2004

Mean	1.410	1.314	1.495	1.486	1.542	1.533	1.568	1.552	1.594	1.582
Std Dev	0.213	0.309	0.285	0.287	0.195	0.192	0.275	0.242	0.175	0.222

Mean 1.508
Nobs 243.000



graph

LOG_URIC_ACID vs LOG_PFOA: WW 2004, Terms=LogPFOA BMI ALC4
Where Sex=M, Hear tmeds=B

