

Blood Metals in Pregnant Women Enrolled in the Vanguard Study (VS)

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Background: We conducted a pilot study that included measuring a number of environmental chemicals and nutritional biomarkers in a convenience sample of VS participants. The study intent was to provide exposure and nutritional biomarker data to inform decisions regarding analytes for inclusion in the Main Study.

Methods: Whole blood was collected at the first (T1) prenatal visit into a pre-screened vial, shipped to the Repository on ice and then stored. Tubes from approximately 50 pregnant participants at each Vanguard Center (VC) were shipped to the Division of Laboratory Sciences on dry ice, where each sample was assayed for whole blood lead, total mercury, cadmium, selenium, and manganese. Analyses were performed using inductively coupled plasma dynamic reaction cell mass spectrometry, the same methodology used by this laboratory for measuring blood metals for the National Health and Nutrition Examination Survey (NHANES).

Results: Metals were measured in approximately 450 pregnant women from the 7 VCs. Values in $\mu\text{g/L}$ for the geometric mean (95% CI), median, and upper 95% CI were as follows:

Analyte	Geometric mean	(95% CI)	Median	95 th %tile
Cadmium	0.209	(0.196-0.222)	0.190	0.770
Lead	0.431	(0.408-0.456)	0.410	1.34
Total Mercury	0.580	(0.533-0.631)	0.580	2.92
Manganese	10.77	(10.45-11.10)	10.63	18.41
Selenium	178.7	(176.6-180.9)	180.7	215.5

Conclusions: In this convenience sample, blood total mercury and cadmium levels were generally similar to those reported in U.S. females aged 1 year and older in NHANES. Geometric blood lead levels in these pregnant women were about the half the value of those in U.S. females and 2-3 times lower than adults 20 years and older in recent NHANES. There are limited data on manganese and selenium levels in pregnant women, so these results serve as a preliminary reference range until population-based data become available. Blood metals should be included as priority analytes in the NCS Main Study.