

Date 3/9/2023
From HHEAR Data Center
Subject HHEAR Project #2020-00605– brominated flame retardants in plasma
To Noyan Gokce, MD

The brominated flame retardants in plasma data (N=130) analyzed by the Wadsworth HHEAR Targeted Analysis Laboratory for HHEAR project #2020-00605 is now finalized and available on the HHEAR Data Submission and Review Portal (DSRP). Biomarkers in this dataset include 2,2',4,4',6-Pentabromodiphenyl ether (BDE100), 2,2',4,4',5,5'-Hexabromodiphenyl ether (BDE153), 2,2',4,4',5,6'-Hexabromodiphenyl ether (BDE154), 2,2',3,4,4',5',6-Heptabromodiphenyl ether (BDE183), 2,4,4'-Tribromodiphenyl ether (BDE28), 2,2',4,4'-Tetrabromodiphenyl ether (BDE47), 2,2',3,4,4'-Pentabromodiphenyl ether (BDE85), and 2,2',4,4',5-Pentabromodiphenyl ether (BDE99). as per the lab analysis plan.

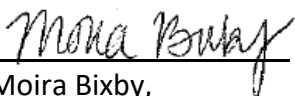
The limit of detection (LOD) values reported were the average of the daily LODs for the whole study. The daily LODs were used to identify the valid values for each sample. Machine-read values were provided for all measurements. Negative values arise legitimately near the LOD, which is by definition +/- 33% of the 'blank' level. The following approaches can be considered for utilizing biomarker values below the LOD:

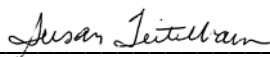
- Use the machine values.
- Substitute a surrogate value for all values \leq LOD, which is often $\text{LOD}/\sqrt{2}$, first recommended by Hornung and used by CDC [1].
- Use a multiple imputation method [2]. In general, a surrogate value is not used in models with continuous variables unless $>60\%$ of the observations are $>$ LOD, as described in Lubin.

Four samples each of HHEAR targeted serum pools A and B were run across batches.

These laboratory results have been reviewed and approved by Sunmi Lee, MS, Research Scientist (sunmi.lee@nyulangone.org) at the Wadsworth HHEAR Targeted Analysis Laboratory for HHEAR to assure that they conform to acceptable quality standards[3]. Summary tables of the study sample data and relevant quality control data are appended at the end of this document.

Signed,


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REPORT OF LAB RESULTS

1 - Summary Table of Sample Data:

Geometric mean and geometric standard deviation, along with the percentile distribution, calculated for study samples with detectable levels (NC- not calculated when detection frequency was less than 70%).

Analyte	Number of Samples Analyzed	Number of Samples >LOD	Percent Detect	LOD	Geometric Mean	Geometric Mean STD	Min	10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile	Max
BDE100 (pg/mL)	130	70	54%	2.50	NC	NC	<LOD	<LOD	<LOD	10.4	24.4	45.5	205
BDE153 (pg/mL)	130	110	85%	2.50	38.7	2.24	<LOD	<LOD	14.6	31.7	59.7	86.8	737
BDE154 (pg/mL)	130	3	2%	2.50	NC	NC	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	20.1
BDE183 (pg/mL)	130	0	0%	2.50	NC	NC	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
BDE28 (pg/mL)	130	67	52%	2.50	NC	NC	<LOD	<LOD	<LOD	2.92	8.88	25.0	154
BDE47 (pg/mL)	130	126	97%	2.50	40.1	2.70	<LOD	9.78	17.5	37.4	75.1	147	463
BDE85 (pg/mL)	130	0	0%	5.00	NC	NC	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
BDE99 (pg/mL)	130	72	55%	5.00	NC	NC	<LOD	<LOD	<LOD	9.45	23.9	38.1	100

2 - Summary Table of HHEAR QC Pools:

A) HHEAR QC Pools Summary Table (Overall) – – Four samples each of HHEAR QC Serum Pools A and B were run along with the study samples in this analysis. Overall means and coefficients of variation were calculated for each pool. Note that results near the LOD are subject to greater uncertainty. *NC- not calculated*

Analyte	Pool	LOD	Total N	Valid N	% Valid	Mean	CV (%)
BDE100 (pg/mL)	H-A	2.50	4	2	50	16.2	26
	H-B	2.50	4	0	0	NC	NC
BDE153 (pg/mL)	H-A	2.50	4	4	100	47.9	19
	H-B	2.50	4	3	75	28.5	18
BDE154 (pg/mL)	H-A	2.50	4	1	25	0	NC
	H-B	2.50	4	0	0	NC	NC
BDE183 (pg/mL)	H-A	2.50	4	0	0	NC	NC
	H-B	2.50	4	0	0	NC	NC
BDE28 (pg/mL)	H-A	2.50	4	0	0	NC	NC
	H-B	2.50	4	0	0	NC	NC
BDE47 (pg/mL)	H-A	2.50	4	4	100	21.6	25
	H-B	2.50	4	1	25	2.99	NC
BDE85 (pg/mL)	H-A	5.00	4	0	0	NC	NC
	H-B	5.00	4	0	0	NC	NC
BDE99 (pg/mL)	H-A	5.00	4	1	25	9.11	NC
	H-B	5.00	4	0	0	NC	NC

References:

1. Hornung, R.W. and L.D. Reed, *Estimation of average concentration in the presence of nondetectable values*. Applied occupational and environmental hygiene, 1990. 5(1): p. 46-51.
2. Lubin, J.H., et al., *Epidemiologic evaluation of measurement data in the presence of detection limits*. Environmental health perspectives, 2004. 112(17): p. 1691-1696.
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4. Protection, N.J.D.o.E., *Data Quality Assessment and Data Usability Evaluation Technical Guidance*. 2014(Version 1.0): p. 1-132.
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6. McGraw, K.O. and S.P. Wong, *Forming inferences about some intraclass correlation coefficients*. Psychological methods, 1996. 1(1): p. 30.
7. Shrout, P.E. and J.L. Fleiss, *Intraclass correlations: uses in assessing rater reliability*. Psychological bulletin, 1979. 86(2): p. 420.
8. Koo, T.K. and M.Y. Li, *A guideline of selecting and reporting intraclass correlation coefficients for reliability research*. Journal of chiropractic medicine, 2016. 15(2): p. 155-163.