



BIOMONITORING CALIFORNIA

Program Update

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Presentation to the Scientific Guidance Panel Meeting

July 14, 2020

Biomonitoring California Staff Updates

- Welcome new staff
 - Susan Hurley and Julia Varshavsky (OEHHA)
- Staff moving on
 - Judy Balmin and Robin Christensen (EHIB)
- Remembering Reber Brown

CARE-3 Time Line

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- February 5 - Postcards mailed
 - February 26 - First samples collected; field work projected to end in May
 - March 16 – CARE-3 closed down

CARE-3 Enrollment

- Invited 526 participants
 - 338 enrolled in the study
 - 90 completed sample collection
 - 245 were in-progress
 - 3 withdrew
- Many expressed interest in continuing participation

CARE-2 Results

- Summary statistics
- Demographic analyses
- Comparing results across regions
 - Consider participation rates and population differences

CARE Participants Compared with Regional Demographics

Race/Ethnicity	% CARE-LA (2018)	% LA County (2017)	% CARE-2 (2019)	% Region 2 (2018)
Asian	16	14	6	6
Black	11	8	5	7
Hispanic	36	48	47	52
White	30	26	37	32
Multiracial/Other	6	3	5	3

CARE Participants Compared with Regional Demographics (cont.)

Gender	% CARE-LA (2018)	% LA County (2017)	% CARE-2 (2019)	% Region 2 (2018)
Male	38	49	43	49
Female	61	51	56	51

Education	% CARE-LA (2018)	% LA County (2017)	% CARE-2 (2019)	% Region 2 (2018)
High school or below	15	42	21	47
Above high school	84	58	79	53

Blood Metals in CARE

Metal n=359	CARE-LA Detection Frequency (%)	CARE-LA Geometric Mean ($\mu\text{g/L}$)*	CARE-2 Detection Frequency (%)	CARE-2 Geometric Mean ($\mu\text{g/L}$)*
Cadmium	99	0.30	98	0.27
Lead	100	0.78 $\mu\text{g/dL}$	100	0.68 $\mu\text{g/dL}$
Manganese	100	10.3	100	10.2
Mercury	95	1.0	95	0.65

* Except where indicated

Limits of detection (LODs) for manganese and mercury were higher for CARE-LA than for CARE-2.

Urinary Metals in CARE

Metal n=357	CARE-LA Detection Frequency (%)	CARE-LA Geometric Mean ($\mu\text{g/g Cr}$)	CARE-2 Detection Frequency (%)	CARE-2 Geometric Mean ($\mu\text{g/g Cr}$)
Arsenic	100	12.1	100	8.0
Cadmium	100	0.25	95	0.24
Cobalt	100	0.31	94	0.26
Mercury	98	0.27	87	0.21
Molybdenum	100	42.7	100	41.4
Thallium	100	0.24	100	0.20

All values are creatinine-adjusted.

Geometric mean not calculated for antimony, manganese, or uranium because detection frequency was below 65%. LODs for cadmium, cobalt, and mercury were higher for CARE-2 than for CARE-LA.

CARE-2 Metals

- Female participants had higher urinary mercury, urinary cadmium, and blood cadmium levels, but lower lead levels, than participants who identified as male
- Levels of arsenic, lead, and cadmium increased with participant age
- Black participants had higher blood cadmium levels than white and Hispanic participants
- Asian participants had higher urinary cadmium levels than white and Hispanic participants
- Urinary Hg levels were higher in participants who chose to participate in Spanish.

PFASs in CARE

PFAS n=358	CARE-LA Detection Frequency (%)	CARE-LA Geometric Mean (µg/L)	CARE-2 Detection Frequency (%)	CARE-2 Geometric Mean (µg/L)
Me-PFOSA-AcOH	100	0.07	79	0.04
PFOA	99	1.0	99	0.98
PFHxS	99	0.61	100	0.78
PFOS	98	2.1	98	2.4
PFNA	97	0.30	92	0.21
PFUA	82	0.08	59	*
PFDeA	70	0.10	66	0.08

Detection frequencies for PFHpA, Et-PFOSA-AcOH, PFOSA, PFBS, and PFDoA were below 65% in both CARE-LA and CARE-2. Geometric means were therefore not calculated. LODs were the same for both CARE-LA and CARE-2.

CARE-2 PFASs

- Men were 24-81% higher than women for PFOA, PFOS, and PFHxS
- PFAS levels increased with age by 8-20% per decade
- Race trends were consistent with literature and CARE-LA
 - Asians generally have higher levels; Hispanics generally have lower levels

1-Nitropyrene (1-NP) in CARE

1-NP Metabolite (n=160)	CARE-LA Detection Frequency (%)	CARE-LA Geometric Mean (µg/L)	CARE-2 Detection Frequency (%)	CARE-2 Geometric Mean (µg/L)
6-OHNP	91	108	89	148
8-OHNP	87	87.9	76	76.1

All values are specific gravity adjusted.
LODs were higher for CARE-2 than for CARE-LA

1-Nitropyrene in CARE-2

- Race was not significantly associated with either metabolite
- Age was inversely associated with 8-OHNP
- Work with diesel equipment in the past 3 days was associated with 6-OHNP
- Unlike in CARE-LA, smoking was not associated with 1-NP in CARE-2

Phenols in CARE-2

Phenol n=151	CARE-2 Detection Frequency (%)	CARE-2 Geometric Mean ($\mu\text{g/g}$ creatinine)
Benzophenone-3	96	24.2
Methyl paraben	94	19.9
Bisphenol A	70	0.657

All values are creatinine adjusted.

Detection frequencies for triclosan, triclocarban, ethyl paraben, and bisphenol S were below 65%.

Geometric means were therefore not calculated.

Butyl paraben and bisphenol F were not reported for CARE-2

LODs for bisphenol A were higher for CARE-2 than CARE-LA.

Phenols in CARE-2

- BP-3 and MP were 300% higher in female participants.
- No associations between race and methyl paraben, BPA, or BP-3
- Age was associated with increased levels of methyl paraben and BPA.
- Participants who reported using lotion six hours or less before sample collection had higher levels of methyl paraben

CARE – Next Steps

- Unlikely to conduct field work in the next year
 - Continued need for physical distancing
 - Redirection of staff to work on COVID-19
 - Budget implications
- Staff will focus on analysis of existing data

AB 617 Update

Support for Community Air Protection Program

The Office of Environmental Health Hazard Assessment (OEHHA) is:

- Researching biomarkers of exposure and effect relevant to air pollution concerns in AB 617 communities
- Working with UC to:
 - Design targeted biomonitoring studies and launch one in an AB 617 community in Northern, Central, or Southern California
 - Develop complementary approaches, such as focused air monitoring and ultrafine particle analysis, to improve biomonitoring data interpretation
 - Measure PAHs in ambient air in Vallejo, to help inform exposure reduction efforts and support future AB 617 community selection

Intra-laboratory Pilot Project (IPP)

- Allows for the collection of samples and exposure information for use in method development
- Working with Dr. Libin Xu towards development of a urinary method for QACs
- Samples collected in 2018 and 2020

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