CDPH
California Department of Public Health

BIOMONITORING CALIFORNIA

Program Update

Presentation to the Scientific Guidance Panel
August 27, 2025
Nerissa Wu

Program Updates

- **Surveillance**
- **Community-focused studies**
- **Laboratory work**
  - Environmental Chemistry Lab
  - Environmental Health Lab
- **Outreach and communications**

Surveillance Studies

Study	Coverage	Sample Collection	Analytes
California Regional Exposure (CARE) Study	3 regions	2018 – 2020	Perfluoroalkyl and polyfluoroalkyl substances (PFASs), metals, phenols, 1-nitropyrene
Studying Trends in Exposure in Prenatal Samples (STEPS)	3 counties	2015 – 2027	PFASs
Measuring Analytes in Maternal Archived Samples (MAMAS)	3 regions	2012, 2015-2016	PFASs, POPs
Future Surveillance	TBD	2028 onward	TBD

California Regional Exposure (CARE) Study

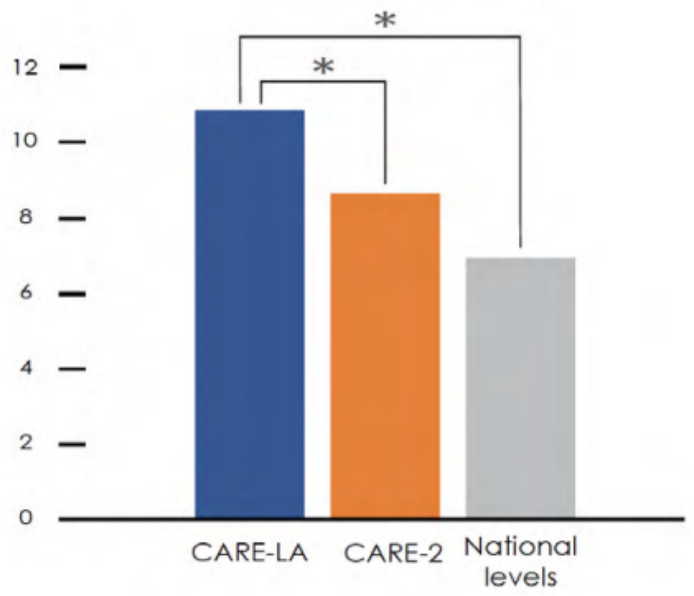
- Publications on PFAS exposures
  - Exposure to legacy per- and polyfluoroalkyl substances from diet and drinking water in California adults, 2018-2020. Environ Sci Tech 59(20). (Pennoyer, et al.)
  - Associations Between PFASs in Public Water System Drinking Water and Serum Among Southern California Adults. J. Expo Sci Environ Epidemiol. (Fillman, et al.)

California Regional Exposure (CARE) Study

- CARE-LA: Weighted population data for speciated arsenic and phenols
  - Results return completed in August 2025
  - Web posting of weighted data pending
  - Data exploration in progress

Why Speciate Arsenic?

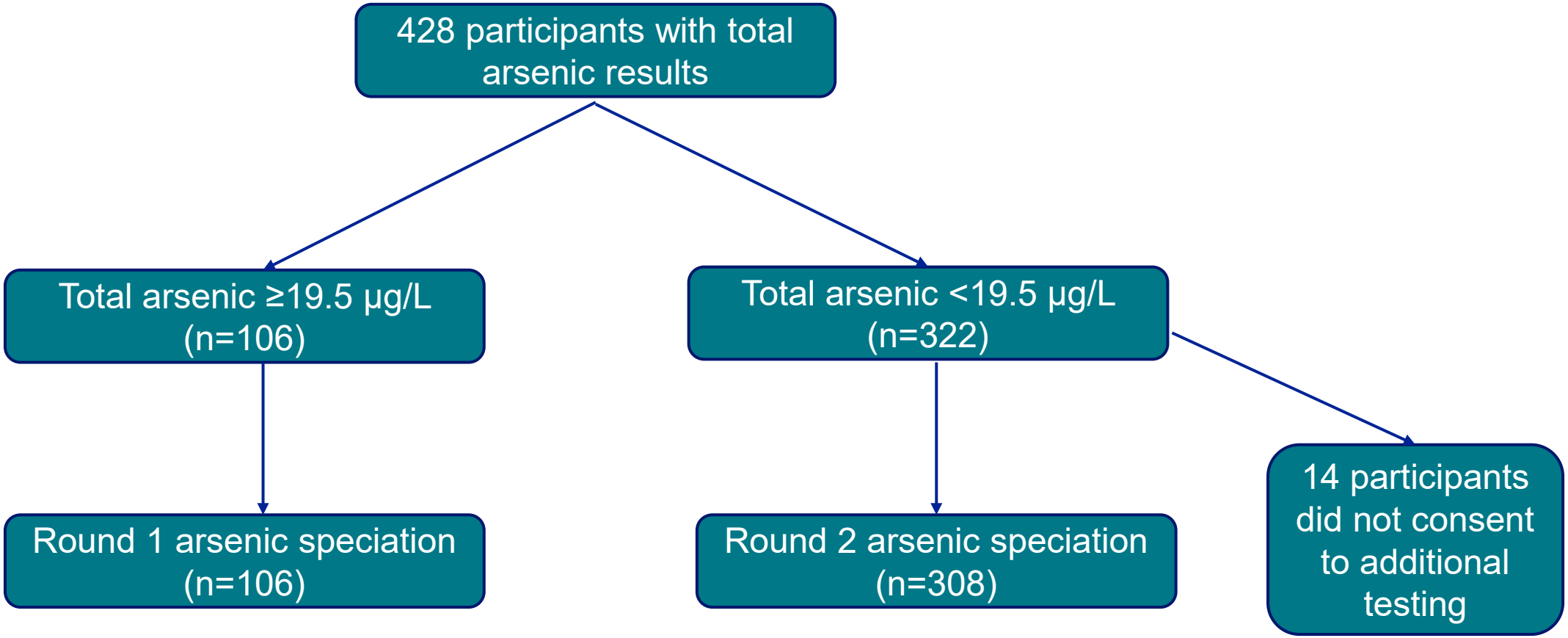
- Organic and inorganic arsenic are generally from different exposure sources
- Inorganic arsenic is more toxic and associated with more health impacts
- Additional data will enable us to look at:
  - Impacts of inorganic arsenic exposure across the population
  - Identify sub-populations that are highly impacted
  - Evaluate exposure contributions from drinking water and other sources



Total urinary arsenic, µg/g creatinine

* Indicates statistically significant comparison

CARE-LA Total Arsenic and Speciation



CARE-LA Speciated Arsenic (n=412)

Analyte	Detection frequency	Geometric mean (µg/g creatinine)	95th percentile (µg/g creatinine)
Sum of inorganic-related species	100%	6.0	22.0
Arsenous (III) acid	84%	0.4	2.3
Arsenic (V) acid	22%	*	1.1
Dimethylarsinic acid	100%	4.5	13.7
Monomethylarsonic acid	95%	0.6	1.7
Sum of organic species	83%	1.8	38.0
Arsenobetaine	82%	1.5	37.9
Arsenocholine	10%	*	0.5

Of the 414 samples analyzed for speciated arsenic, two could not be creatinine adjusted.
Data weighted to underlying population
* GM not reported for analytes with DF ≤ 65%

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Comparison of CARE-LA and NHANES: Detection Frequencies

	CARE-LA	NHANES (2017-2018)
Analyte	**Detection frequency**	**Detection frequency**
Sum of inorganic-related species	100%	74%
Arsenous (III) acid	79%	32%
Arsenic (V) acid	24%	7%
Dimethylarsinic acid	100%	69%
Monomethylarsonic acid	93%	43%
Sum of organic species	84%	48%
Arsenobetaine	84%	46%
Arsenocholine	10%	8%

Weighted data re-censored to highest MDL
* GM not reported for analytes with DF ≤ 65%

Comparison of CARE-LA and NHANES: Geometric Means

Analyte	CARE-LA	NHANES (2017-2018)
	Geometric mean (µg/g creatinine)	**Geometric mean** (µg/g creatinine)
Sum of inorganic-related species	**7.0** ⬆	**4.7**
Arsenous (III) acid	0.4	*
Arsenic (V) acid	*	*
Dimethylarsinic acid	**4.9** ⬆	**3.3**
Monomethylarsonic acid	0.6	*
Sum of organic species	*	*
Arsenobetaine	*	*
Arsenocholine	*	*

Weighted data re-censored to highest MDL
Arrows indicate statistically significant differences
* GM not reported for analytes with DF ≤ 65

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CARE-LA Arsenic Data: Next Steps

Current Issues	Potential partners	Potential analysis directions

• Drinking water
  • California Water Boards is evaluating the feasibility of lowering the MCL
• Diet
	• California Water Boards
	• OEHHA
	• Community partners
	• Academic partners
		• Demographic trends
		• Associations with exposure sources
		  • Drinking water
		  • Diet

Exposure questionnaire data: demographics, diet, drinking water source, occupation, hobbies, smoking

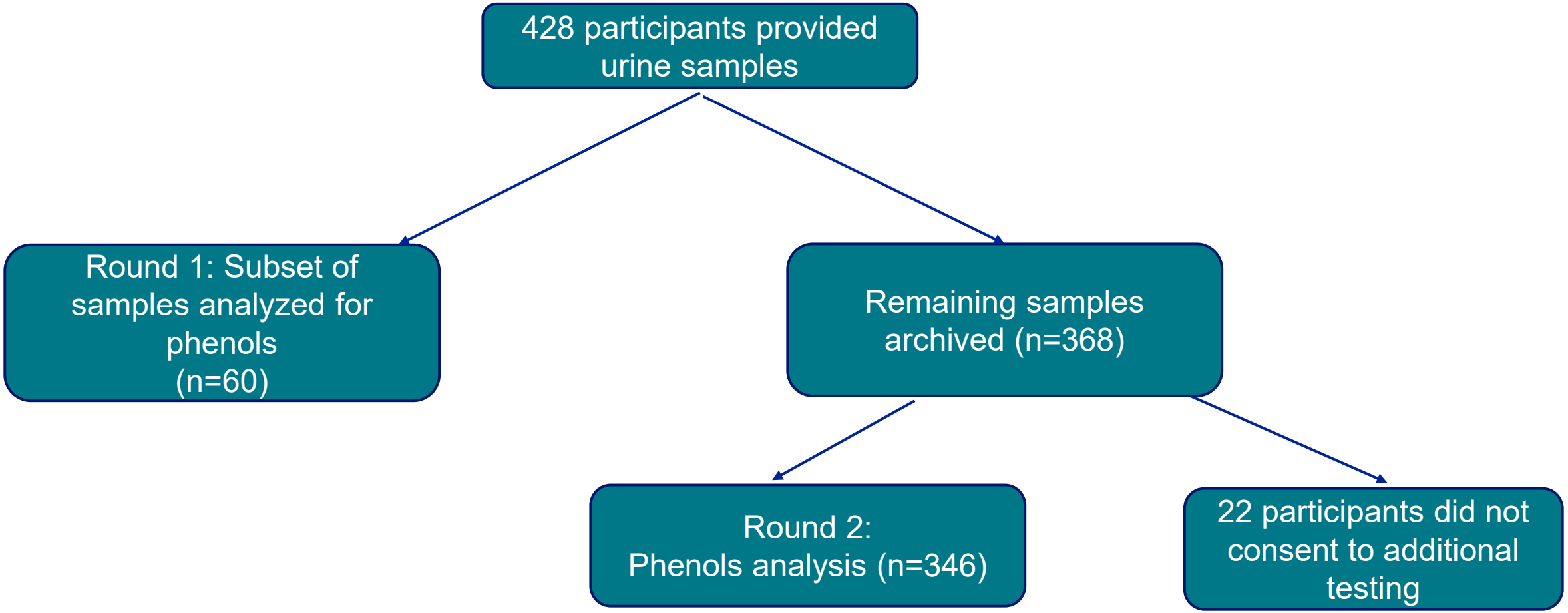
Environmental Phenols Background

- **Environmental phenols** are a broad class of chemicals with a common chemical structure that are used in many different materials.

- Examples include
  - Bisphenol A (BPA) - used in hard plastics, fabric adhesives, and some cash register receipts
  - Bisphenol S (BPS) and Bisphenol F (BPF) - substituted for BPA in some uses
  - Parabens - added as preservatives to personal care and other products
  - Benzophenone-3 (BP-3) - UV stabilizer and the active ingredient in many sunscreens

- Many phenols affect the endocrine system.

CARE-LA Phenols Analyses



CARE-LA Environmental Phenols (n = 406)

Analyte	Detection Frequency	Geometric Mean (µg/g creatinine)	95th Percentile (µg/g creatinine)
Benzophenone-3	96%	35.3	783
Bisphenol A	78%	0.6	5.1
Bisphenol F	28%	*	5.9
Bisphenol S	76%	0.8	6.9
Ethyl paraben	35%	*	66.7
Methyl paraben	83%	18.4	389
Propyl paraben	66%	3.5	158
Triclocarban	16%	*	0.3
Triclosan	38%	*	528

Data weighted to underlying population

* GM not reported for analytes with DF ≤ 65%

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Comparison of CARE-LA and NHANES: Detection Frequencies

Analyte	CARE-LA (2018) Detection Frequency	NHANES (2015-2016) Detection Frequency
Benzophenone-3	**96%**	93%
Bisphenol A	**70%**	94%
Bisphenol F	**28%**	46%
Bisphenol S	**76%**	81%
Ethyl paraben	**28%**	49%
Methyl paraben	**82%**	98%
Propyl paraben	**66%**	97%
Triclocarban	**16%**	32%
Triclosan	**38%**	66%

Weighted data re-censored to highest MDL

Comparison of CARE-LA and NHANES: Geometric Means

Analyte	CARE-LA (2018) Geometric Mean (µg/g creatinine)	NHANES (2015-2016) Geometric Mean (µg/g creatinine)
Benzophenone-3	**35.3** ↑	21.2
Bisphenol A	**0.67** ↓	1.1
Bisphenol F	*	*
Bisphenol S	**0.8** ↑	0.5
Ethyl paraben	*	*
Methyl paraben	**20.6** ↓	36.2
Propyl paraben	**3.5**	4.9
Triclocarban	*	*
Triclosan	*	6.2

Weighted data re-censored to highest MDL
Arrows indicate statistically significant differences
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CARE-LA Phenols Data: Next Steps

Current Issues

- Consumer products and personal care products
  - Propyl and butyl paraben in skin applied/leave-in products
- SB-1226 – bans bisphenols in juvenile products (January 2026)

Potential Partners

- Other California programs
  - Safer Consumer Products Program
  - California Safe Cosmetics Program
  - OEHHA
- Academic and other research partners

Potential analysis directions

- Demographic trends
- Associations with exposure sources

Exposure questionnaire data: demographics, diet, occupation, hobbies

Studying Trends in Exposures in Prenatal Samples (STEPS)

Sample Collection Location/Years	# Samples Acquired	Status
Orange County (2015-2021)	521	All samples analyzed for PFASs ECL conducting QA
Fresno County (2015-2021)	523	298 samples analyzed for PFASs
Los Angeles County (2024)	1856	Sample selection and analysis not yet initiated

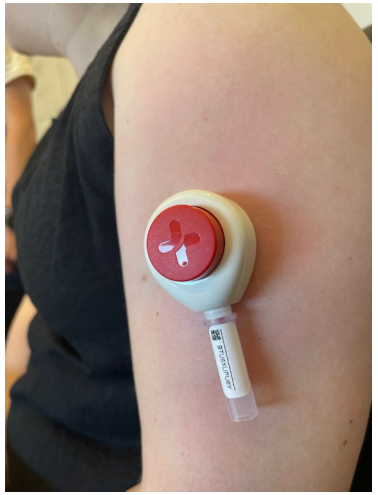
Measuring Analytes in Maternal Archived Samples (MAMAS)

- Trends of perfluoroalkyl and polyfluoroalkyl substances (PFASs) and persistent organic pollutants (POPs) in pregnant Californians (Dobraca et al.)

- Persistent organic pollutant (POP) levels in Californians: Shouldn't hexachlorobenzene be decreasing? (Tang et al.)

Future Surveillance Planning

- Developing study protocol
  - Primary goal: to develop a methodology that can be implemented consistently into the future
  - Considering what analytes are most important to include
  - Considering potential study regions
  - Working on making field work more efficient through the evaluation of micro-samplers



Community-Focused Studies

- Asian/Pacific Islander Community Exposures (ACE) Project
- Stockton Air Pollution Exposure Project (SAPEP)
- Biomonitoring component of the San Joaquin Valley Pollution and Health Environmental Research Study (BiomSPHERE)
- Farmworker women & Respiratory Exposure to Smoke from Swamp Cooler Air (FRESSCA–Mujeres)

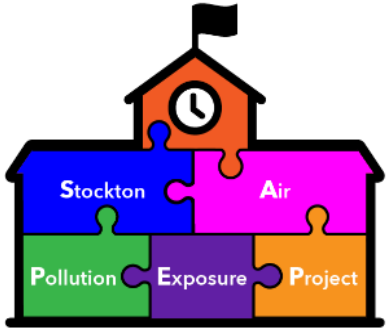
Results Communications for Community-Focused Studies

- Results returned for polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs)
- Evaluation of results return materials ongoing

- Results returned for PAHs, VOCs, and metals
- Community meeting held on July 29th

Findings from Community-Focused Studies

- Associations between seafood consumption and serum PFAS levels among Asian/Pacific Islanders in the San Francisco Bay Area, California (ACE Project) – in review



- Levels of urinary PAH and VOC biomarkers among California schoolchildren living in an area heavily impacted by air pollution (SAPEP) - submitted for publication

Environmental Chemistry Laboratory

STEPS Samples

- PFAS analyses for 819 samples completed
  - Orange County: 521 samples analyzed
  - Fresno County: 298 samples analyzed

Continued Method Development

- Preparing for demonstration of new methods using Intraprogram Pilot (IPP) serum samples
  - Cyclosiloxanes
  - PAHs

Environmental Health Laboratory (EHLB)

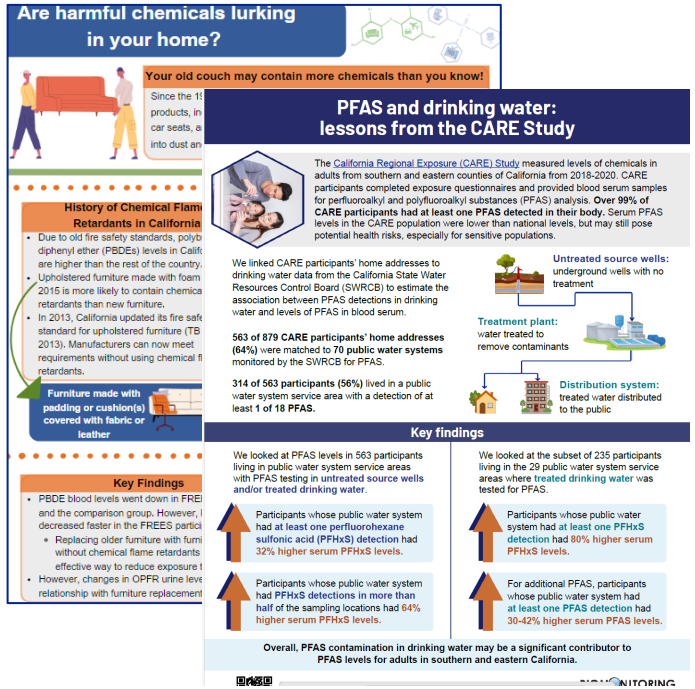
California Regional Exposure (CARE) Study

- CARE-LA: Environmental phenols results reported (n=346)
- CARE-2: Arsenic speciation analyses almost complete (n=299)
- CARE-2: Phenols analyses to start (n=194)

Exploration of New Biomarkers

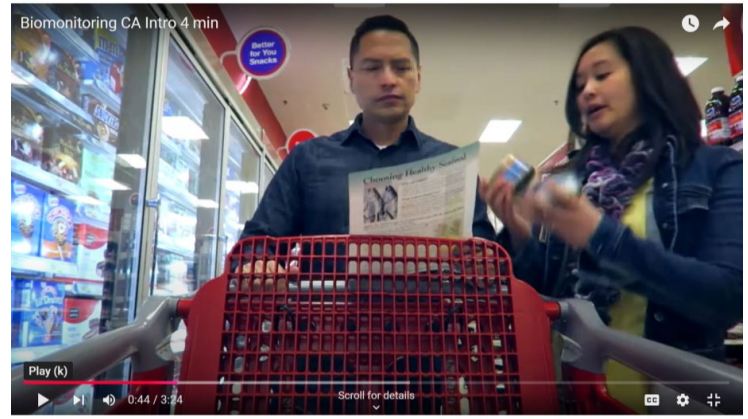
- Using non-targeted screening to improve targeted methods and potentially identify additional chemicals of concern
  - Identifying new biomarkers of PAH exposure, including carboxylated PAH metabolites
  - Using AI to support staff efforts to identify new potential biomarkers in both biomonitoring and product samples

Outreach and Communications



Fact Sheets

Social Media



Videos

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Staff Update

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Nerissa Wu

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^ New staff
*** Departed staff**

BIOMONITORING CALIFORNIA

MEASURING CHEMICALS IN CALIFORNIANS

Questions?