BIOMONITORING CALIFORNIA

Program Update

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Presentation to the Scientific Guidance Panel Meeting

March 7, 2023

CDPH California Department of PublicHealth

Overview

- Administrative updates
- Project updates
  - STEPS
  - CARE-Water Board PFAS data project
  - Asian/Pacific Islander Community Exposures Project
  - Communications updates
  - Lab updates

Staff Update

Dinesh Adhikari	Dina Dobraca	Stephanie Jarmul	Roshni Sarala
Kathleen Attfield	Julian Edmonds^	Duyen Kauffman	Jianwen She
Hyoung Gee Baek	Toki Fillman	Emilie Kadhim	Dan Sultana
Paramjit Behniwal	Jon Gallardo	Amber Kramer	Andrew Tan
Kelly Chen	Songmei Gao	Ilaria Lentrichia^	Darcy Tarrant
Key-Young Choe	Qi Gavin	Kiera Melton	Miaomiao Wang
Sabrina Crispo Smith	Ranjit Gill	Bisha Neupane^	Shizhong Wang
Josephine DeGuzman	Cheryl Holzmeyer	June-Soo Park	Yunzhu (Judy) Wang
Jagdish Dhaliwal	Amanda Hooker	Myrto Petreas	Lily Wu+
Joginder Dhaliwal	Susan Hurley	Martha Sandy	Nerissa Wu

*Departing staff
^New staff
+Acting staff

Studying Trends in Exposures in Prenatal Samples (STEPS)

- Requesting chosen samples from Biobank
  - 166 samples in each of 2015, 2018, 2021
- Planning prospective sampling in a non-Biobank county with Genetic Disease Screening Program staff

California Regional Exposure (CARE) Study Working with CA Water Board

- Understand data coverage and overlaps for PFAS testing
- Identify data gaps that Water Board investigative orders could address
  - Public water systems where CARE participants with high blood levels live but do not have drinking water data
- Assess feasibility of different investigative questions
  - Examine the relationship between drinking water and biomarker data
  - Estimate the relative source contribution of drinking water to PFAS exposure for risk assessments

CARE studies

- CARE LA (2018)
  - n = 430
- CARE 2 (2019)
  - n = 359
- CARE 3 (2020)
  - n = 90

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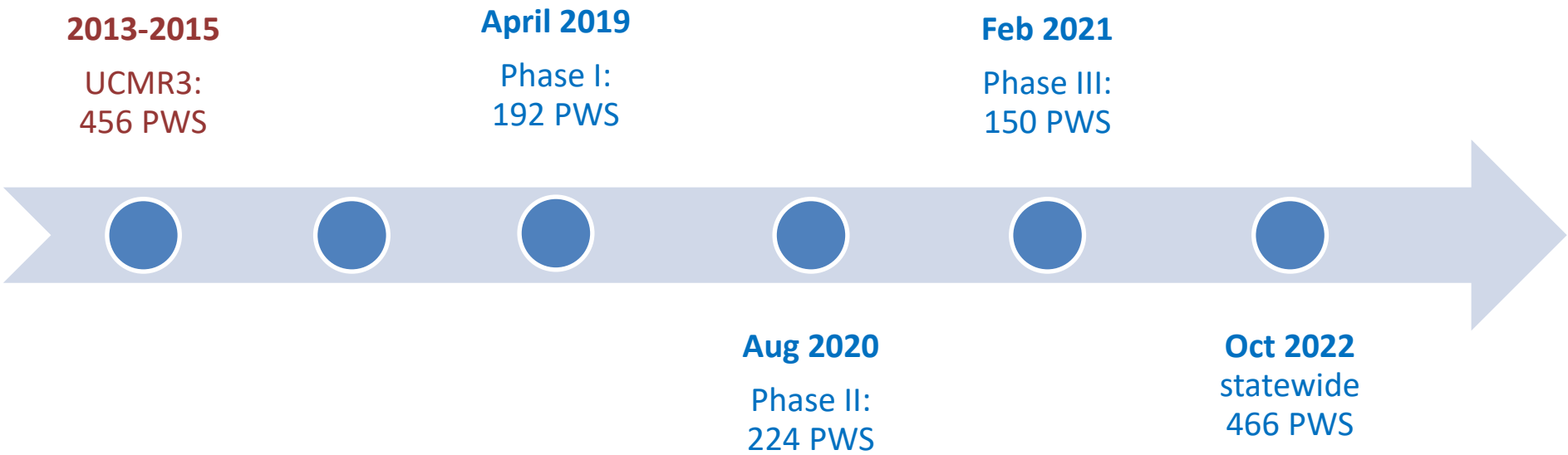
PFAS Testing in Drinking Water

1. EPA Unregulated Contaminant Monitoring Rule (UCMR) 3
   - Mainly public water systems (PWS) serving ≥10,000 people
   - Samples from point of entry to distribution system
   - High method detection limits
2. CA Water Board Monitoring
   - Three completed phases of investigative orders
   - Most sampling from source wells but includes some finished water
   - Lower method detection limits



Overlap Between CARE Participants and Drinking Water Data

- By participant (n=872)

	MDL range (ng/mL)	# of participants matched to a water system	Tested for PFAS		At least one PFAS detected	
UCMR3 2013-2015	10-90 ng/L	848	813	96%	65	8%
CA Water Board 2016-2022	2-4 ng/L	848	685	81%	366*	53%

Water Board SDWIS files downloaded as of 12.20.22
*additional data available for some systems below the stipulated minimum method detection limit (MDL)

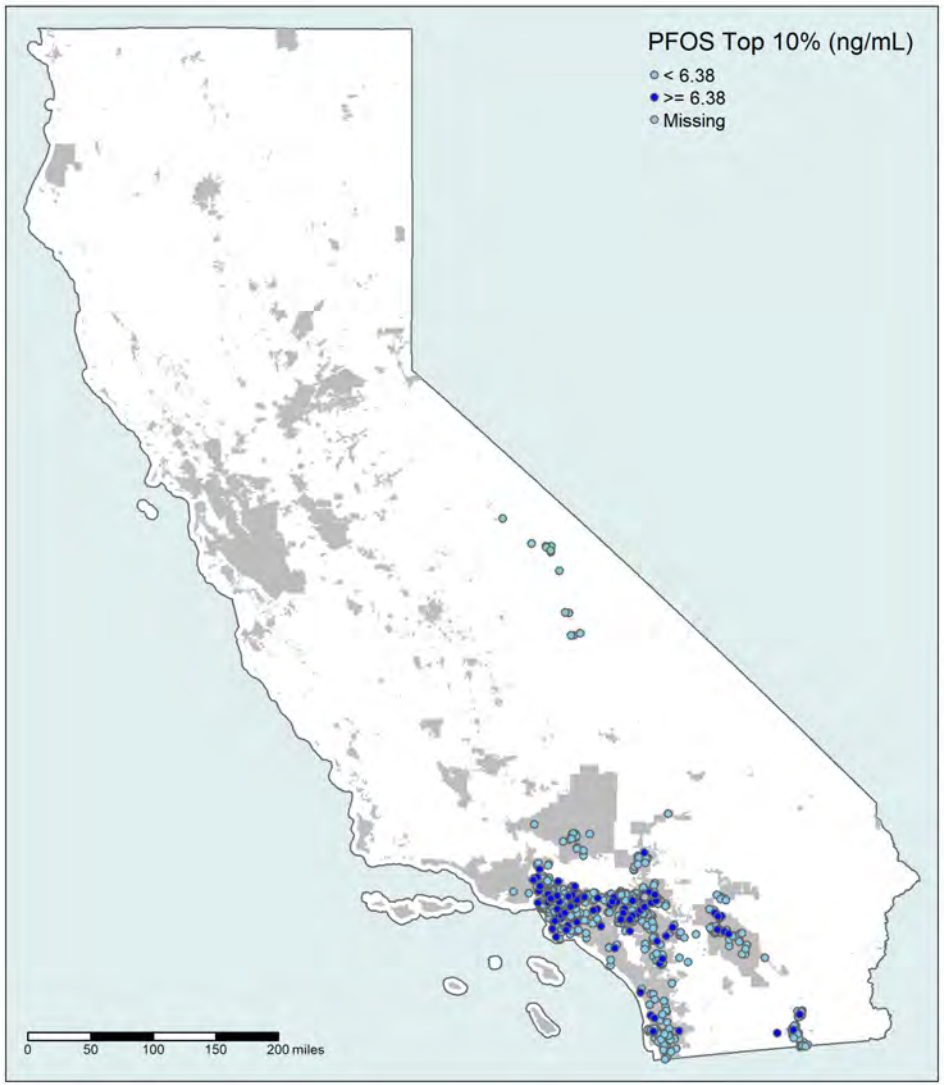
Overlap Between CARE Participants and Drinking Water Data

- By water system

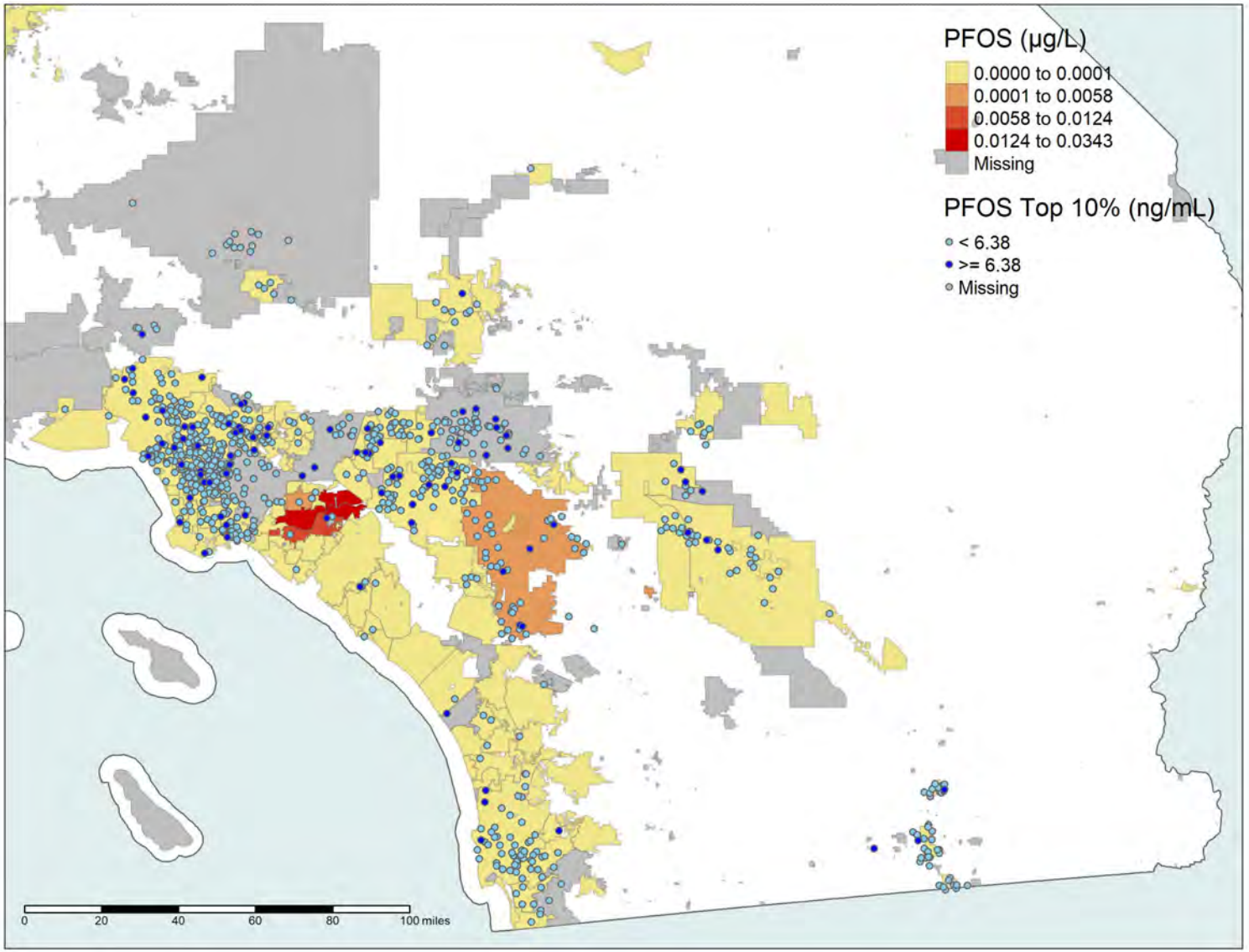
	# of water systems matched to participants	# of participants per water system	Tested for PFAS		At least one PFAS detected	
UCMR3 2013-2015	150	7 (1-184)	119	79%	11	9%
CA Water Board 2016-2022	150	10 (1-184)	75	50%	48*	64%

*additional data available for some systems below the stipulated minimum MDL

Top 10% of CARE Participants by PFOS Levels



UCMR3 Results and Top 10% of CARE Participants for PFOS

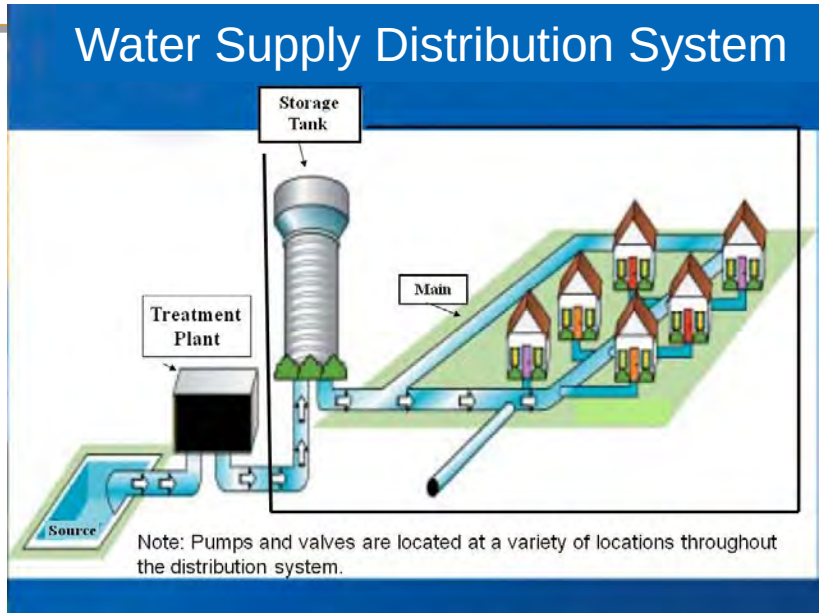


Participants with High Biomarker Levels but No Water Data

- 4 with top 10% of PFOA or PFOS levels
- 11 with top 25% of PFOA or PFOS levels

Challenges

- Creating a summary statistic for the end user
  - Many different sampling points within systems
  - Data collected for regulatory purposes and to evaluate raw sources
- Assigning individuals to single water systems
  - Some system boundaries in process of being validated
  - Temporarily there are overlaps
    - Have reduced # of participants with overlaps from 274 to 91



Asian/Pacific Islander Community Exposures (ACE) Project

- Extension of collaborations for health education & outreach on safer fish consumption
- Community-based study to biomonitor Asian populations
  - Metals: arsenic, cadmium, lead, mercury
  - 32 PFASs

Two Phases of ACE

ACE 1: 100 Chinese American participants, mostly in San Francisco, in 2016

ACE 2: 100 Vietnamese American participants, mostly in San Jose, in 2017

Prior Findings: Metals Levels of Concern (LOC)

Urinary Arsenic	LOC
Total	≥ 50 µg/L
Inorganic	≥ 20 µg/L
Blood Mercury	
Women 18-49 yrs	≥ 5.8 µg/L
Women over 49 yrs and all men	≥ 10 µg/L

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Prior Findings: Metals

High numbers above our LOCs

	ACE 1	ACE 2	CARE-LA
Urinary Arsenic	n=100	n=100	
Total	18%	36%	6.3%
Inorganic	26%	26%	5.1%
Blood Mercury	n=96	n=99	
Women 18-49 years	8%	16%	2.6%
Women over 49 years and all men	5%	9%	3.3%

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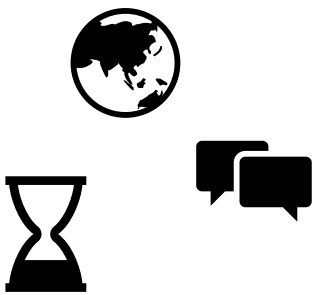
Prior Findings: PFAS

- Higher levels of 5 PFASs than 2016-2017 NHANES
  - PFOS and PFNA higher than Asians within NHANES
- Acculturation factors often associated with higher levels
  - Birth country, time spent in the US, interview language



Reconnecting with Existing Stakeholders

- Highlighting findings from project
  - Consistent with groups' concerns?
- Follow up on educational efforts
- Exploring utility of particular additional analyses

Questions of Interest

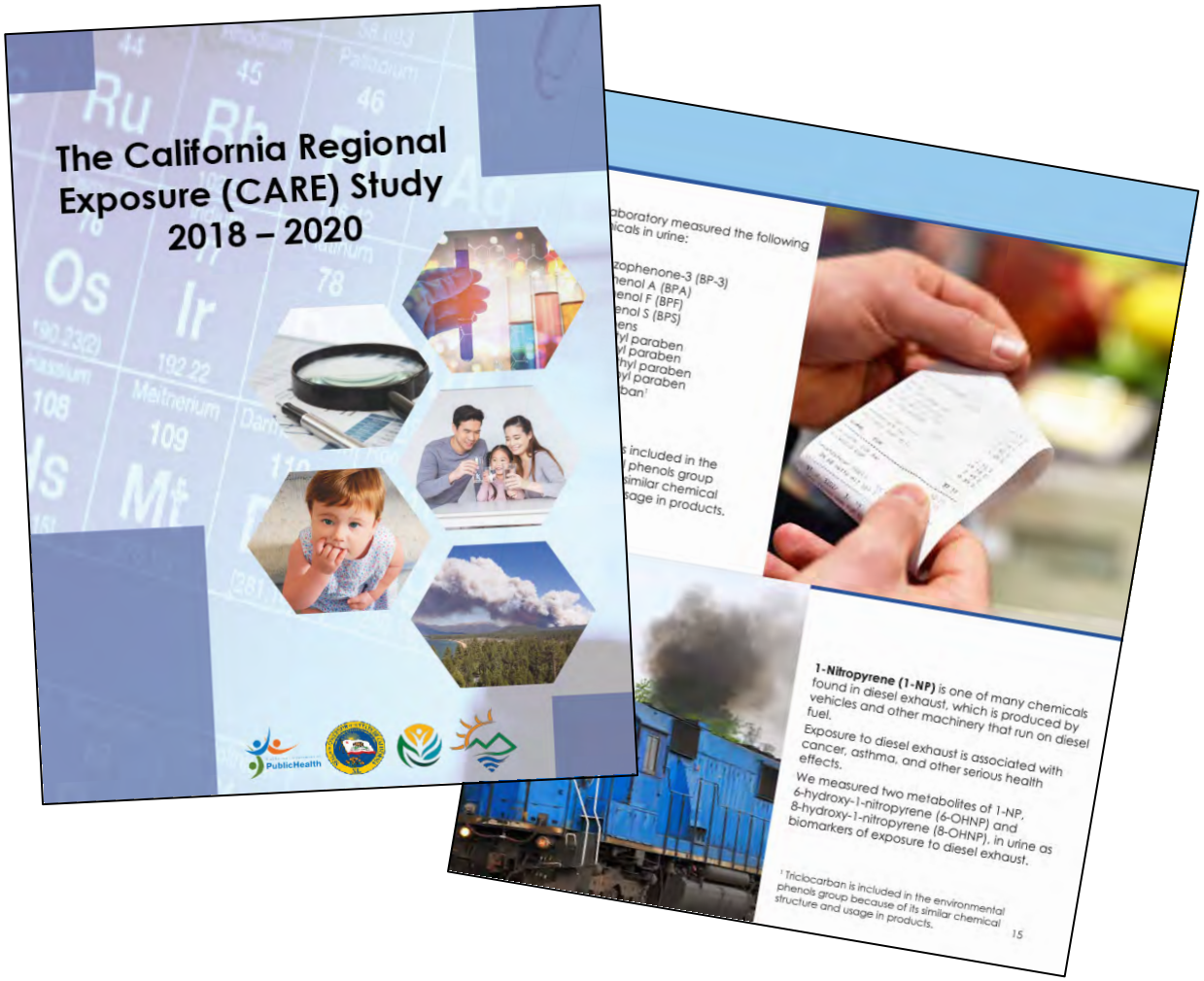
- PFAS and fish consumption (types, parts)
- Metals and herbal remedies/personal care products
- Occupational exposures among immigrants
  - Collaboration with Silent Spring Institute

ACE Exposure Questionnaire

- 18 questions about **rice and rice products**, such as rice noodles, rice vinegar, and rice syrup
- 26 questions about **fish and seafood**, such as source, type, and frequency and manner of consumption (e.g., eating of fish heads, organs, etc.)
- Other questions about **diet**: seaweed; candies; and other foods, spices, and supplements, including traditional Chinese medicine
- Use of **personal care products**, including imported creams for skin lightening or whitening
- Occupation and industry
- Other activities, such as welding and metalworking
- Smoking

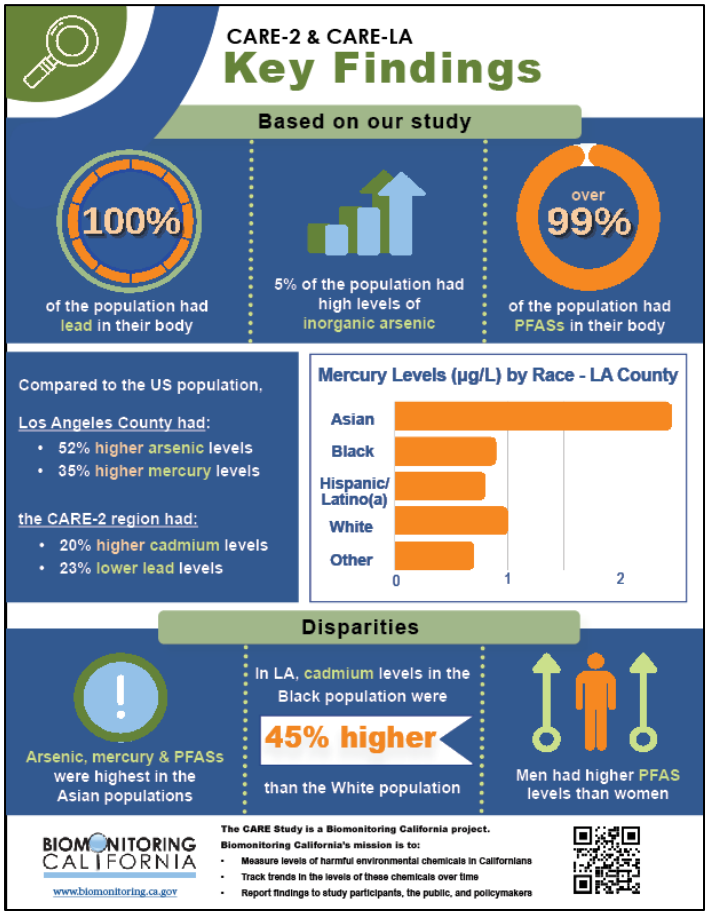
Outreach & Communications Team Projects

- Finalizing the CARE Report



Outreach & Communications Team Projects

- Finalizing the CARE Report and dashboard summary



Outreach & Communications Team Projects

- Focus on visual fact sheets and other accessible and engaging materials for the general public
  - Arsenic in rice
  - Foam Replacement Environmental Exposure Study (FREES) paper

Environmental Health Lab Updates

- Initiating additional environmental phenols analyses for the CARE Study
  - CARE-LA: 370
  - CARE-2: 190
- Developing method for directly measuring metabolites of BPA
  - 4 glucuronide and sulfate conjugates
  - LOQs 0.01-0.1 ng/mL

Environmental Health Lab Updates

- Validating the speciated urinary mercury method
  - Inorganic mercury and monomethyl mercury
- Developing total nickel analysis by ICP-MS
  - For use in air pollution community studies
- Continued work on the VOC urinary metabolite method

Environmental Chemistry Lab Updates

- Extended PFAS method
  - Instrument analysis of serum and plasma comparison complete, final data analysis in progress
- Updates to POPs (PCB/OCP/PBDE) method
  - Reduced sample preparation time from ~ 48 hours to 7 hours by upgrading automated SPE system
- New methods under development
  - Siloxane and PAHs in serum

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Thank you to participants, collaborating organizations, and staff!

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Questions?