



BIOMONITORING CALIFORNIA

Program Update

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Presentation to the Scientific Guidance Panel

August 2023 SGP meeting (rescheduled to November 6, 2023)

Overview

- Administrative updates
- Project updates
 - California Regional Exposure (CARE) Study
 - Asian/Pacific Islander Community Exposures (ACE) Project
 - Studying Trends in Exposures in Prenatal Samples (STEPS)
- Lab Updates
- Communications updates



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***Departed staff**

^New staff

7th Legislative Report Released

- Reporting period: July 2019 – June 2021
- Covers Program activities and recommendations for future priorities

Implementation of the California Environmental Contaminant Biomonitoring Program: 2019-2021

Seventh Report to the California Legislature

July 2019 – June 2021




California Department of Public Health
In collaboration with
California Environmental Protection Agency's
Office of Environmental Health Hazard Assessment and
Department of Toxic Substances Control



Project Updates

- California Regional Exposure (CARE) Study:
 - Are PFAS Serum Levels Associated with Drinking Water PFAS Levels?
 - Identifying Dietary Sources of PFAS Exposure
- Asian/Pacific Islander Community Exposures (ACE) Project: Associations Between Participant PFAS Levels and Fish Consumption Habits
- Studying Trends in Exposures in Prenatal Samples (STEPS)

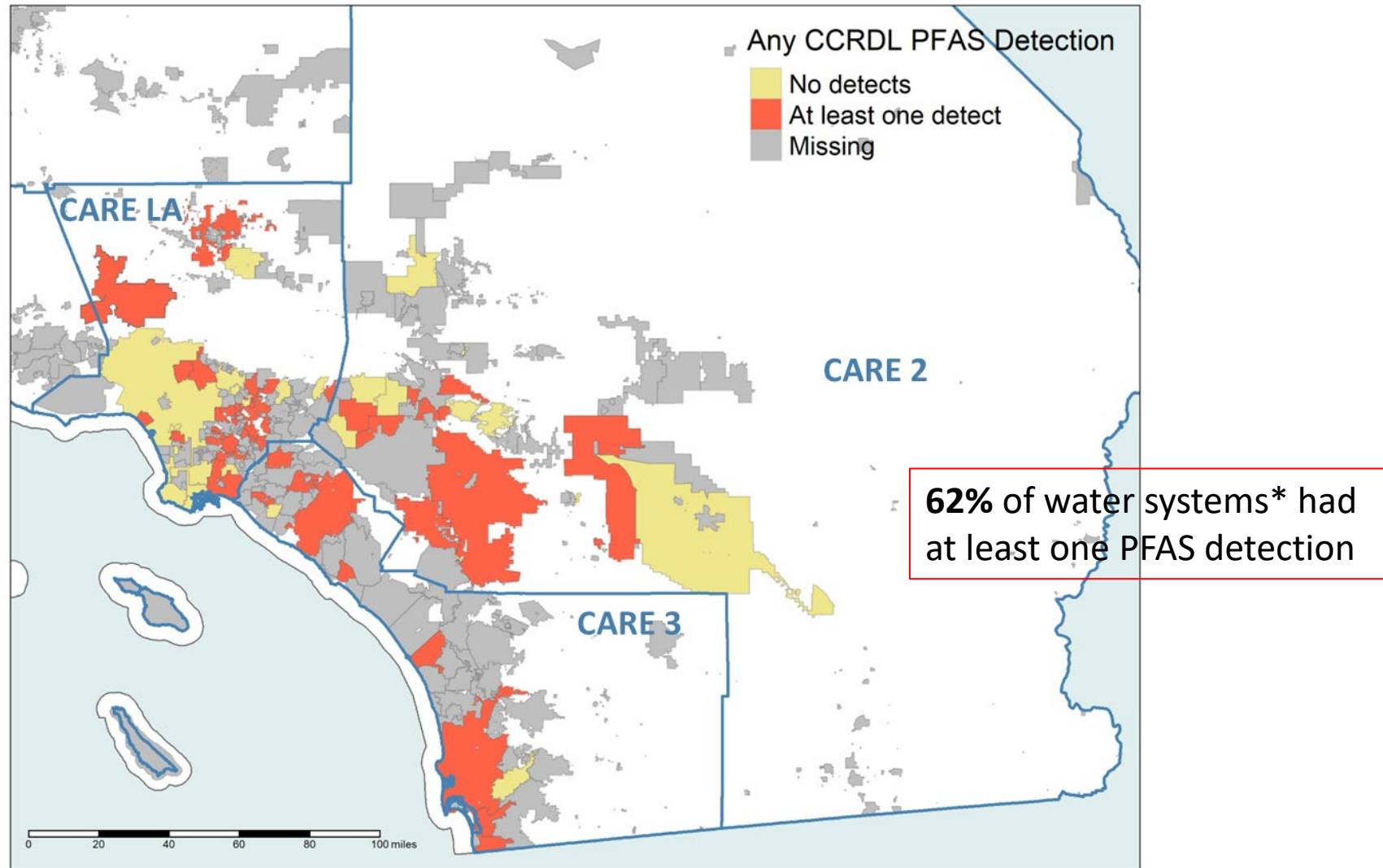


CARE Study: Are PFAS Serum Levels Associated with PFAS Levels in Drinking Water?

Assigning a PFAS exposure indicator for CARE Study participants

- Working with Water Board to validate boundaries
 - Initially 42% of participants were assigned to multiple jurisdictions
 - All but 4% now assigned to single jurisdiction
- Incorporating data on water purchasing/mixing
- Collecting data on finished water from Consumer Confidence Reports

Most tested water systems had detectable PFAS



*Of the 75 water systems matched to a CARE participant with Water Board testing data



CARE Study: Additional Work

- Meeting with Water Board in late November to relay initial results
- Looking ahead to potential impacts of EPA PFAS Maximum Contaminant Levels
- Strategizing with CalEnviroScreen staff on how to incorporate PFAS water data
- Identifying dietary sources of PFAS exposure (collaboration with Boston University)

Asian/Pacific Islander Community Exposures (ACE) Project: Participant PFAS levels and fish consumption

- Focused on:
 - Chinese community in the San Francisco area (2016)
 - Vietnamese community in the San Jose area (2017)
- Participants were biomonitored for:
 - PFASs
 - metals (mercury, lead, cadmium, and arsenic)



National Academies of Sciences, Engineering, and Medicine: PFAS Exposure, Testing, and Clinical Follow-up (2022)

Analyte	Risk-Based Level (serum)	Associated Impact	ACE Project (%)	CARE Studies (%)
PFAS (sum of MeFOSAA, PFHxS, PFOA, PFDA, PFUndA, PFOS, PFNA)	< 2 ng/mL	Adverse health effects not expected	1%	12%
	2 to <20 ng/mL	Potential for adverse health effects, especially among sensitive populations	76%	85%
	≥ 20 ng/mL	Increased risk of adverse health effects	23%	3%

ACE Exposure Questionnaire

- **Within the past year, consumption of:**
 - Fish and shellfish purchased in stores
 - Fish and shellfish caught by self, friends, or family
 - Fish products
- **Within the past 30 days, consumption of:**
 - Fish and fish products
 - Shellfish and shellfish products
 - Rice and rice products
 - Take-out or bakery foods
- **Fish parts (ACE 2 only), consumption of:**
 - Fish eyes, head, organs, and/or skin

Associations Between Participant PFAS Levels and Fish Consumption Habits

- Examining dietary habits of ACE participants
 - 59% reported eating seafood at least twice per week (compared with 20% in NHANES)
 - 84% (ACE 2 only) reported eating non-fillet parts of fish
- Are participant PFAS levels associated with:
 - Self-caught vs. purchased fish
 - Consumption of non-fillet parts
 - Habitat of fish commonly consumed



Using ACE Data to Inform Fish Advisories

- 16 states have PFAS-specific fish advisories
- PFAS data in fish are limited
- Testing of San Francisco Bay Area fish species that ACE participants reported eating revealed PFOS levels that would trigger other states' PFAS fish consumption advisories
- ACE data, shared with the Water Board's Safe to Eat Workgroup, provides details on fish consumption habits, which may be considered in developing guidance

Washington PFOS Fish Consumption Advisory

Fish Consumption Advisory	PFOS (ppb)
No Advisory	< 1.8
8 meals/month	1.8 - 2.3
4 meals/month	2.4 - 4.7
2 meals/month	4.8 - 9.4
1 meal/month	9.5 - 28.2
Do not eat	> 28.2

Studying Trends in Exposures in Prenatal Samples (STEPS)



- Develop PFAS exposure estimates and time trends (2015 – present) among pregnant people in two California counties
 - Orange County
 - Evidence of PFASs in drinking water (2013-2015)
 - Water District initiated water quality strategies in 2016
 - Fresno County
 - Understudied area with little information on drinking water or serum PFAS levels
- Random selection of samples based on eligibility criteria
 - Nulliparous individuals
 - Healthy, singleton pregnancy

Studying Trends in Exposures in Prenatal Samples (STEPS)



Sample Collection Location	Birth Year	# Samples	Status
Orange County	2015	175	All 521 samples acquired
	2018	174	
	2021	172	
Fresno County	2015	174	All 523 samples acquired
	2018	175	
	2021	174	

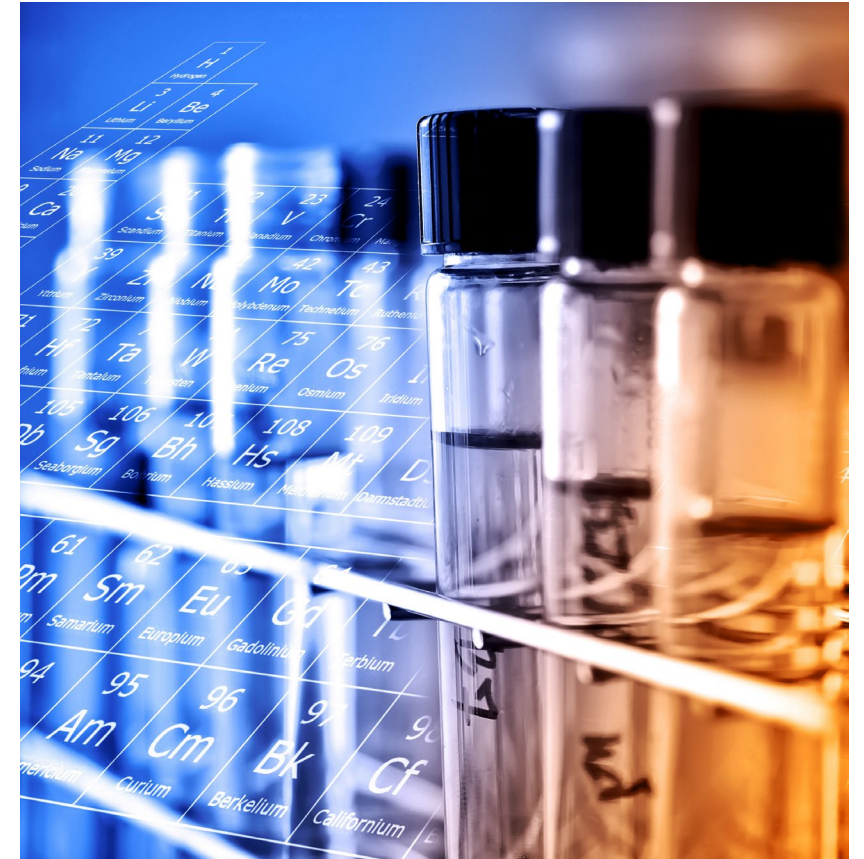
Studying Trends in Exposures in Prenatal Samples (STEPS)



- Analyzing samples for PFASs will be conducted over the next 2-3 years
- Working to establish prospective sampling from a non-Biobank county
- Amplifying the impact of STEPS by developing collaborations to:
 - Measure additional chemicals or biomarkers
 - Identify potential PFAS exposure sources (e.g. drinking water)
 - Evaluate associations with health outcomes

Environmental Health Laboratory Updates

- Methods development
 - Nickel added to urinary metals panel
 - VOC urinary metabolite method currently being validated
 - Mercury speciation method development continuing
- Sample management for BiomSPHERE and FRESSCA Mujeres
- Phenols analyses and arsenic speciation for all CARE-LA participants





Environmental Chemistry Laboratory

- Completed PFAS analyses on paired plasma and serum samples for the Intra-Program Pilot (IPP) Study
- Preparing to analyze 1000+ samples for STEPS Study
- Method development:
 - Siloxane and PAHs in serum
 - Initiating work on total fluorine in consumer products

Factsheets in Progress

- Arsenic in Rice factsheet - currently being evaluated by community partners
- Foam Replacement and Environmental Exposure Study (FREES) – factsheet in development

Are harmful chemicals in your home?

Your old couch

Since the 1970s, many products, including car seats, and into dust and

History of Chemical Flame Retardants in California

- Due to old fire safety standards, polybrominated diphenyl ether (PBDEs) levels in California are higher than the rest of the country.
- Upholstered furniture made with flame retardants in 2015 is more likely to contain older flame retardants than new furniture.
- In 2013, California updated its standard for upholstered furniture (California Code of Regulations, Title 17, 2013). Manufacturers can now meet requirements without using older flame retardants.

Furniture made with padding or cushioning covered with fabric or leather

More about arsenic

What is arsenic?

Arsenic is a naturally occurring element found in soil and water in some areas. It is also found in rice and other foods. It can harm health when too much is eaten.

Why does rice have arsenic?

- Rice plants are very good at taking up arsenic from water and soil. Rice can absorb up to ten times more arsenic than other grains like wheat.

Arsenic in Rice and Rice Products

Should you be concerned about arsenic in rice?

Rice is an important food for many people. It is nutritious, but rice also contains arsenic, which can harm health. Here is advice to help you and your family reduce your exposures to arsenic from rice and rice products.

What can you do?

Eat less rice

- Eat a variety of foods.
- Replace rice and rice noodles with other foods like barley, oats, quinoa, couscous, and cauliflower rice.
- Swap brown rice for lower arsenic grains. Brown rice usually contains more arsenic than white rice.
- Check food labels and avoid rice flour, rice milk, and brown rice syrup.
- Reduce rice cereal as a baby food or thickener. Avoid infant formulas and foods containing brown rice syrup.

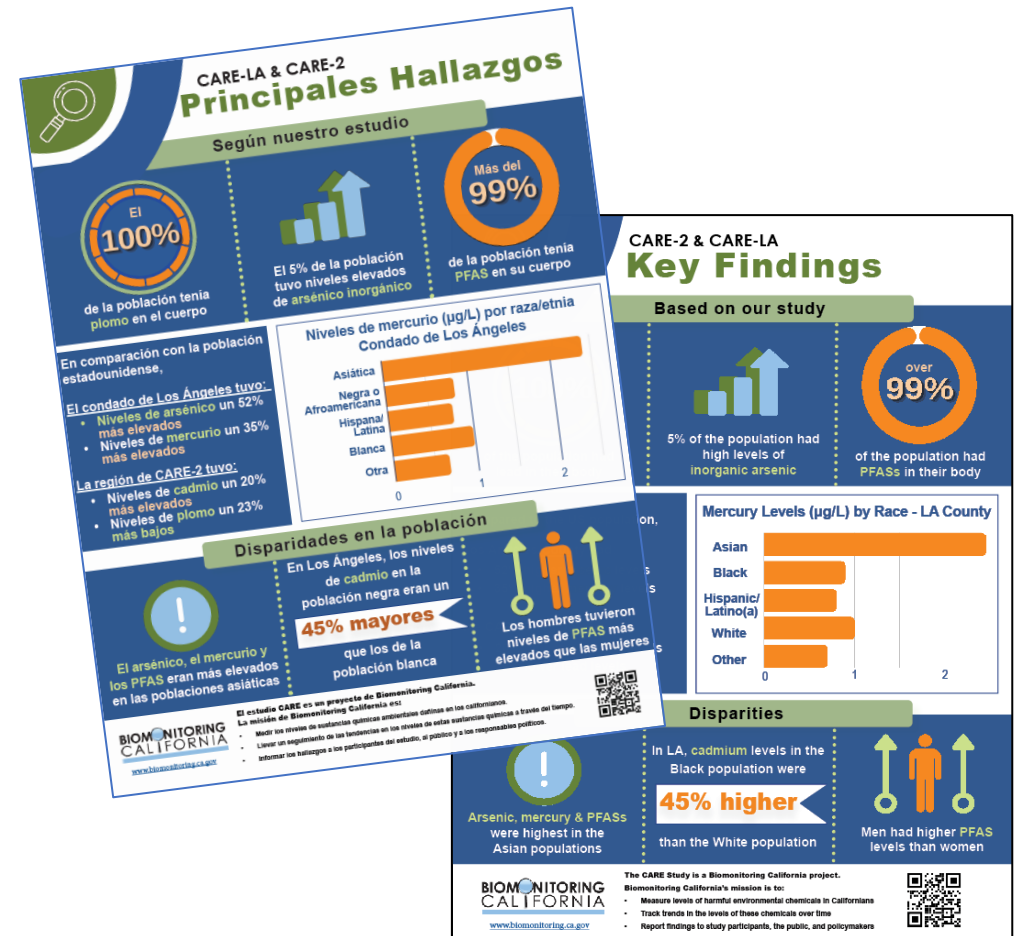
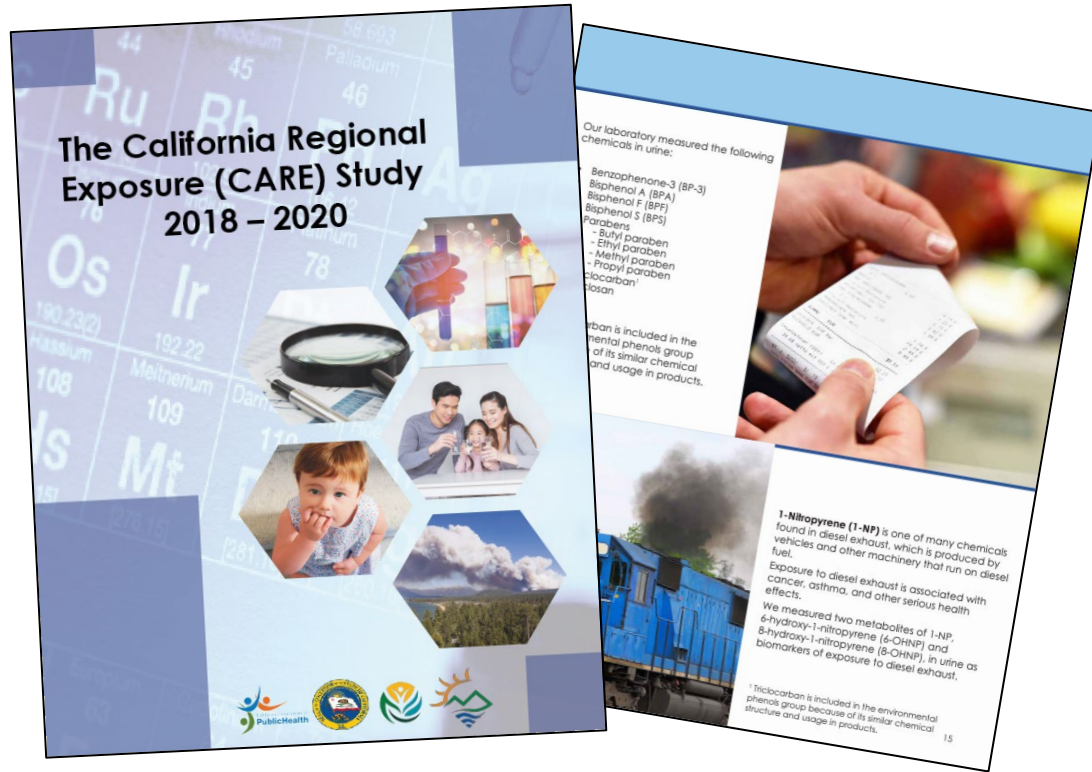
Cook rice a new way

This way uses more water to reduce arsenic in rice:

1. Boil water (4 cups for every cup of raw rice)
2. Add rice and boil for 5 minutes
3. Pour out the hot water
4. Add fresh water to the rice (2 cups for every cup of rice)
5. Cook rice with a lid on low to medium heat until all the water is absorbed

Another way to remove some arsenic from rice is by soaking it overnight, then draining the water and cooking as usual with fresh water.

CARE Study Results



- CARE Study Report will be released in early 2024
- Two-page graphic summary of study findings has been posted on the website

AB 496: Cosmetic Safety Legislation

- Starting in 2025 will prohibit distribution of personal care products that contain certain ingredients
- Program has historically measured some of the banned ingredients:
 - Mercury
 - Parabens (Isobutyl- and isopropyl-)
 - Phthalates (Dibutyl- and Diethylhexyl-)
 - Some PFASs
- Opportunity to monitor changes in population exposures



Program Evaluation Interviews

- Conducting interviews with researchers, advocates, community organizations, and State and Federal programs
- Collecting feedback on program impact and recommendations for future activities for the 8th Legislative Report and for program planning





Questions?