March 2025 Meeting of the Scientific Guidance Panel for Biomonitoring California

Summary of Input and Recommendations

The Scientific Guidance Panel (SGP) for the California Environmental Contaminant Biomonitoring Program (also known as Biomonitoring California) met in Oakland on March 25, 2025. This document briefly summarizes input and recommendations received from the Panel, as well as the range of topics discussed with the audience. Visit the March 2025 SGP meeting page to access the presentations, transcript, and other meeting materials.

SGP Panel Members in Attendance

Carl Cranor, PhD, MSL, Acting Chair
Thomas McKone, PhD
Amy Padula, PhD, MSc
Lara Cushing, PhD, MPH, *attended remotely*
Penelope (Jenny) Quintana, PhD, MPH, *attended remotely*
José Suárez, MD, PhD, MPH, *attended remotely*

Program Update

Presentation: Nerissa Wu, PhD, MPH, California Department of Public Health (CDPH)

Panel members discussed the following topics with Program staff:

- Biomonitoring California's analysis of California Regional Exposure (CARE) Study data to identify differences in levels of metals in urine and blood for participants living in areas recently affected by wildfires and/or participating in wildfire debris and ash cleanup activities.
    - Although the sample size was small, the analysis identified significantly elevated urinary mercury levels among CARE-LA and CARE-2 participants who reported cleaning up debris and ash after a wildfire event.
        - These results are consistent with findings from Biomonitoring California studies of firefighters in which levels of urinary and blood mercury were elevated compared to levels from the US Centers for Disease Control and Prevention National Health and Nutrition Examination Survey (NHANES).
        - There were no significant associations with wildfire exposures and blood mercury in either CARE study.
    - Burning of household consumer products, such as electronics, may be a source of mercury exposure.
        - Ash analysis might clarify the sources but is beyond the scope of the CARE studies and Biomonitoring California.

    - Future analysis of the CARE data might explore the feasibility of accounting for other variables such as:
        - Time elapsed between exposure to wildfires and biomarker sampling.
        - Linking residential location to the closest fire and smoke plume data.
        - Participants' diet, specifically adjusting for food items that are relevant to mercury exposure.

- Incorporating consent language in Biomonitoring California surveillance studies to allow for recontact of participants when extreme events such as wildfires occur.
    - An emergency response Institutional Review Board (IRB) protocol would also allow the Program to biomonitor populations soon after extreme events occur.

- The possibility of using data from the Studying Trends in Exposure in Prenatal Samples (STEPS) study to look at chemicals which may be relevant to wildfire exposures.

- The importance of evaluating the Program's results return materials, particularly among culturally- and language-diverse populations.
    - The evaluation of the results return materials for the Biomonitoring component of the San Joaquin Valley Pollution and Health Environmental Research Study (BiomSPHERE) will also solicit feedback from participants on alternative methods of results dissemination, including the use of the Digital Exposure Report-Back Interface (DERBI) platform created by the Silent Spring Institute.

Update on Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs) and Drinking Water in California

Presentation: Emily Pennoyer, PhD, MPH, Boston University School of Public Health, Maine Center for Disease Control and Prevention
Presentation: Wendy Linck, PG, PMP, Division of Water Quality, State Water Resources Control Board

Panel members, staff and guest speakers discussed the following topics:

- Additional analyses to consider for assessing exposures to legacy PFASs from diet and drinking water in California.
    - Potential use of the US EPA's UCMR (Unregulated Contaminant Monitoring Rule) 5 data on PFASs measured in drinking water.
        - While UCMR 5 has lower detection limits for PFASs than UCMR 3, the UCMR 5 drinking water samples were collected in 2023-2025, while serum samples were collected in 2018-2020 for the CARE studies.

        - There have been several regulatory and legislative events between UCMR 3 and UCMR 5, particularly orders about notification levels that may have changed the PFAS concentrations in water and therefore current water concentrations may not be reflective of the CARE participants' exposures.
    - The effect of filtered and bottled water consumption on the analysis.
        - While Dr. Pennoyer's analysis did not stratify between CARE participants who primarily drank bottled water vs tap water, a parallel analysis that Biomonitoring California conducted did stratify by primary drinking water type. This parallel analysis used PFAS water concentrations from a different sampling effort conducted by California's State Water Resources Control Board (referred to hereafter as Water Board) and showed stronger associations between serum and drinking water levels for PFHxS in participants who primarily drank tap water, suggesting that the effect seen in Dr. Pennoyer's analysis is from tap water.
    - Water filters may be effective in removing PFASs. While the range of filter efficiencies is unknown, use of water filters would be important to include in future analyses.

- The significant negative associations between using heat-at-home foods with serum PFAS levels may be residual confounding from other factors associated with socioeconomic status.
    - Education and income are imperfect proxies for socioeconomic status as income can often be misreported or not reported at all. While the missing data was imputed, it may not reflect the true differences in socioeconomic status.
    - Type of housing, or renting vs owning a home is another potential socioeconomic variable to control for.
    - Using factor analysis, an index can be created using all the scores related to socioeconomic variables. Models can use this index as a single covariate to adjust for relevant socioeconomic variables.

- Missing drinking water data from the CARE population.
    - As UCMR 3 did not test every water system for PFASs and 20% of CARE participants had missing data, the smaller water systems may not be well represented.
        - In the parallel analyses by Biomonitoring California using the Water Board's PFAS water data, serum PFAS concentrations in participants missing PFAS water data (who matched to smaller water systems) were similar to participants with PFAS water data, suggesting that the exclusion of these participants did not bias the analysis.

        - Preliminary UCMR 5 data shows that participants in larger water systems had a higher proportion of above the US EPA maximum contaminant level (MCL) for PFOA, PFAS, and PFHxS compared to smaller water systems, with the inverse for PFNA.

- California's activities compared to other states' and federal strategies for regulation of PFASs.
    - Other states are regulating PFASs using a variety of strategies: some are regulating them as individual analytes and others are using a sum approach.
    - At this time, the California Water Board's Division of Drinking Water has plans to lower their response levels and notification levels to match US EPA's MCLs.
    - Surface water sources in California were not measured for PFASs as the funding from PFAS General Order DW-2024-0002-DDW was directed towards groundwater wells.
        - The US EPA tests both surface water and groundwater when testing for MCLs.
        - A year ago, a small study sampled water intake into the Sacramento and Feather Rivers and did not find elevated PFAS levels.

- The Water Board's plans to look at the efficacy of PFAS treatment systems by analyzing the same set of analytes in the influent and effluent.
    - Some of the work will be done before 2026.
    - The water systems in Southern California would be good candidates for the study. More work needs to be done to identify the best combination of different types of water systems.

- The ubiquitous presence of ultrashort-chain PFASs such as trifluoroacetic acid (TFA) in all the groundwater wells that were measured by the Water Board.
    - TFA is a manmade compound that has several uses which makes it hard to tease out a source.
        - TFA is used in certain herbicides and fungicides and therefore it would be important to examine its concentrations in groundwater well sites that are close to agricultural areas.
        - Medications such as Prozac can break down into TFA.
        - TFA can be a degradation product of other PFASs.
        - TFA was also widely used in the 1950s in the hydrofluorocarbon market. As some of these wells are deep, the concentrations can reflect legacy sources.
    - The ubiquitous presence of TFA in groundwater wells highlights the importance of monitoring for TFA in biomonitoring studies as well.
        - There are plans to run a pilot study measuring TFA in a subset of the Program's samples.
    - For groundwater wells where TFA was detected, exposure profiles should be generated that identify potential nearby sources, populations the wells serve, and other PFASs detected that have MCLs.

- Differences in results between the targeted PFASs method and the adsorbable organic fluorine (AOF) method.
    - Results from the two methods may not be highly correlated as AOF may be identifying other compounds including pharmaceuticals and pesticides.
    - While AOF isn't perfect, it is preferred over the total organic fluorine (TOF) method.