August 2026 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 August 3, 2026. This document briefly summarizes input and recommendations received from the Panel, as well as the range of topics discussed with the audience. Visit the August 2026 SGP meeting page to access the presentations, transcript, and other meeting materials.

SGP Panel Members in Attendance

Thomas McKone, PhD, Chair
Lara Cushing, PhD, MPH
Timur S. Durrani, MD, MPH, MBA
Oliver Fiehn, PhD
Penelope (Jenny) Quintana, PhD, MPH
Carl Cranor, PhD, MS, *attended remotely*
José Suárez, MD, PhD, MPH, *attended remotely*

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

Panel members and the audience discussed the following topics with Program staff:

- The high detection frequency of urinary arsenic species in the California Regional Exposure Study, Los Angeles County (CARE-LA) compared to the National Health and Nutrition Examination Survey (NHANES).
    - Additional data analyses will be conducted to examine how environmental and lifestyle factors contribute to urinary arsenic levels.
    - Diet will be considered as a potential contributor to elevated arsenic levels.
        - Rice and seafood are common sources of arsenic. Other foods such as apples and grapes should also be considered.
            - Rice grown in arsenic contaminated soils, brown rice, and brown rice-based processed foods tend to have higher levels of arsenic.
        - Measuring arsenic levels in rice could be useful to help identify potential sources of arsenic.
            - The Minnesota Public Health Laboratory has examined levels of arsenic in different types of rice.

        - CARE-LA has a food frequency questionnaire that will be used to examine associations between food consumption and arsenic levels.
            - There is a subset of questions on food consumption for the 24 to 72 hours preceding the sample collection. This timepoint is most relevant to arsenic due to its short half-life.
    - Data on arsenic levels in drinking water across the United States has improved. Obtaining geographically identifiable NHANES data is challenging. However, linking that data with drinking water information may help clarify drinking water's contribution to the overall body burden of arsenic.
    - The California Regional Exposure Study, Region 2 (CARE-2) identified higher levels of arsenic in Asian participants compared to non-Hispanic White participants, which is similar to trends seen in CARE-LA and NHANES.
        - Further analyses will examine differences in arsenic species by race/ethnicity in CARE-LA.
        - Identifying highly exposed populations will help the Program present relevant exposure reduction strategies.
        - Racially-based assumptions should be treated with caution, and all potential sources of arsenic should be examined.

The Use of Biomonitoring Data in Chemical Risk Assessments and Management in Canada

Opening Remarks: Kathleen Attfield, ScD, CDPH

Presentation: Tyler Pollock, PhD, Senior Scientist, Environmental Health Science and Research Bureau, Healthy Environments and Consumer Safety Branch, Health Canada

Panel members and the audience discussed the following topics with guest speakers and Program staff:

- Health Canada's national human biomonitoring (HBM) program through the Canadian Health Measures Survey (CHMS).
    - The program undergoes a chemical consultation and prioritization process which identifies which chemicals will be measured in each CHMS cycle.
    - The program has measured and may continue to measure chemicals such as bisphenols, triclosan, parabens, phthalates, and UV filters that are used in self-care and consumer products.
    - The program plans to look at nanoparticles in future cycles.

- The challenges of limited biospecimen volume when considering use of biomonitoring data for risk assessment.

    - Younger participants tend to provide smaller volumes. Canada's HBM program works with analytical laboratories to develop different collection protocols that rely on a smaller sample volume for this population.
    - The chemicals measured by HBM in blood and urine each cycle are selected based on risk assessment priorities as mandated by the chemical consultation and prioritization process.

- Potential identification of highly exposed subpopulations for non-toxic compounds that have low detection frequencies in CHMS (e.g., vanadium)
    - Many of the substances assessed through the qualitative approach were only included in one cycle of CHMS (2009-2011), and therefore they do not have ongoing data for rare earth metals and minerals such as vanadium. These may be prioritized for the next cycle.
    - It is important to have a sufficiently sensitive analytical method to measure these chemicals.
    - An audience member noted that the exposure risk as well as the toxicity and health effects are significant for vanadium pentoxide.

- Measuring biomarkers of effect to generate evidence of biological impacts of chemicals to support risk assessment.
    - The joint use of both biomarkers of effect and biomarkers of exposure in risk assessment is still in development.
    - Health Canada currently uses external studies and literature to identify evidence of biological effects.
    - Canada's HBM program is gathering evidence to support the measurement of biomarkers of effect before they're measured in future cycles.

- The different approaches for deriving human biomonitoring guidance values (HBM-GVs).
    - Exposure guidance values, health effects, specific points of departure, and occupational exposures can all be used to calculate HBM-GVs.
        - Canada's HBM program is guided by occupational monitoring such as biological exposure indices which are specific to occupational levels. Some European countries have specific HBM-GVs for occupational exposures.
        - HBM-GVs can also be based on exposure guidance values that are focused on acceptable daily intakes or reference exposure limits (RELs).
        - European countries first determine which critical health effect is most important and only derive an HBM-GV for that specific health effect.
    - Cumulative and class-based exposure approaches may also be considered. Canada's chemicals management plan will be considering bisphenol analogues as a class and will use a human biomonitoring-based approach.

    - Inhalation of metal-containing particles such as zinc and selenium can have local effects in the respiratory tract, which would not be reflected when comparing biomonitoring guidance values to systemic health standards.

- The importance of identifying priority populations and exposure sources and/or routes, and developing biomonitoring standards like HBM-GVs that protect the most vulnerable populations.

- The use of biomonitoring equivalents (BEs) and HBM-GVs in data analyses and report-back materials.
    - There are differing opinions on whether it is appropriate to compare individual biomonitoring results with HBM-GVs.
        - BEs and HBM-GVs were meant to be compared with population-based values.
        - It is recommended to have repeated measures for each participant to capture variability before comparing to biomonitoring guidance values, especially for chemicals with short half-lives.
    - A physician and/or exposure scientist would need to be available to help interpret the values and answer questions from the participants.
    - Currently, CHMS only includes guidance values for blood lead and mercury in report-back materials.
    - The International Human Biomonitoring Working Group is developing a position paper to guide the use of biomonitoring guidance values in report-back materials.

- Examining cumulative exposures when preparing risk assessments.
    - OEHHA groups hazard quotients (HQs) based on the toxicological basis for endpoints for risk assessment to examine cumulative exposures.
        - The HQ is calculated by dividing the concentration of a chemical by its reference level.
        - HQs can be combined for substances which impact the same target organ to develop a hazard index.
        - Chemicals without reference doses should be prioritized for toxicological assessments to identify a preliminary reference dose or reference exposure level.
    - CHMS measures the “exposure load” of an individual to determine if their concurrent exposure to multiple substances is over a certain threshold.
        - The threshold can be defined in multiple ways including the analytical limit of detection or concentration percentiles in the population.
        - A high exposure load suggests that the participant is highly exposed to multiple chemicals compared to the general population.

        - A recent publication examined the number of substances individuals in Canada were exposed to, grouping these substances according to their critical health effects.
    - HBM-GVs are based on exposures to one substance at a time, therefore more research is needed to develop guidance values for multiple compounds across different classes.

Evaluating Participant Feedback on Biomonitoring California Results Return Materials
Presentation: Kiera Melton, MPH, CDPH
Presentation: Nancy Burke, PhD, Professor of Public Health, Department Chair, University of California (UC) Merced

Panel members and the audience discussed the following topics with guest speakers and Program staff:

- Communication and interpretation of biomonitoring results for chemicals that do not have clinical guidelines.
    - The Program is mandated by legislation to return results even when clinical guidelines are not available.
        - This can cause confusion among participants regarding the significance of their individual results.
    - Other state biomonitoring programs provide reference ranges to participants when returning results. However, these ranges may be interpreted as indicating a safe or normal level when a result falls within them, even though most chemicals do not have a known safe level.
    - It is important to communicate these findings carefully, as they may generate concern about family health and lead individuals to feel that they are living in a highly polluted environment.
    - The International Human Biomonitoring Working Group is working on developing chemical-specific health-based guidance values, and it was suggested that these values could potentially be used in future results return materials.

- Recommendations on how to improve the results return packets and participants' understanding of their individual results.
    - It was suggested that artificial intelligence (AI) could be used to make the content accessible to participants with different literacy backgrounds.
        - It is important for humans to review the language to ensure accuracy and relevance.
    - A video tutorial showing participants how to navigate and interpret the results return packets could be developed.
        - Older participants may have a harder time accessing the video, particularly if they're not familiar with QR codes.

        - Participants would still have to opt-in to watch the video themselves.
        - Other state biomonitoring programs developed similar videos and found that few participants viewed it.
        - A Zoom meeting held shortly after the results are distributed may be more interactive and engage participants more directly.
    - Graphs can be an effective tool for communicating results.
        - Bar graphs may be easier for participants to understand. The Program currently uses bar graphs when returning results to participants who exceed levels of concern.
    - Participants value knowing where their results stand in the context of other participants in the study and other studies, such as NHANES. Color coding might be helpful to explain this clearly.
        - Avoid using green, yellow, and red, because these colors often have clinical implications or may be used in other areas such as the Air Quality Index (AQI).
    - A summary page at the beginning of the packet may be helpful to inform participants of actions they can take to reduce exposures to the chemicals that were measured.
    - Contacting local physicians or health workers early in the study to inform them about the study and what the results mean may be helpful as participants may contact them to discuss their results.
        - They could also attend community meetings to help frame what the results could mean for potential health outcomes.
        - The Program could consider looking at educational materials used by medical providers for guidance.
    - Biomonitoring California has already incorporated some feedback from the results return evaluation into our results return materials.
    - The most effective and ideal approach for improving participants' understanding of results would be to schedule individual follow-up sessions if resources allow.
        - Future studies should try to include funding for community or health workers to provide consultations to participants after receiving their results.

- The Program's interactions with participants throughout the studies.
    - For community-focused studies, the Program holds community meetings at the end of each study to disseminate the results to participants and other community members. During these meetings, study participants are invited to have one-on-one conversations with staff to discuss their results.
        - The time between sample collection and the community meeting can be lengthy.
        - It is important to have other touch points with participants throughout the study. This can build relationships and enhance the ability of the participants to understand their results.

    - The Program has an ongoing campaign through social media to build public capacity to talk about environmental exposures. This would be helpful to point participants to, especially in studies where it may take some time for them to receive their results.

- The use of a digital interface such as the Digital Exposure Report-Back Interface (DERBI) from Silent Spring.
    - A digital interface may enable the participant to receive their results faster.
    - When results are released at different time-points, it would be helpful to have all the results in a single location, as participants may not retain their earlier reports.
    - DERBI is Health Insurance Portability and Accountability Act (HIPPA) compliant and does not store IP addresses.
    - DERBI uses strip plots to communicate results to participants.
        - These plots have been extensively tested for usability and results showed that most people understand their graphs but are lacking confidence in their understanding.
            - DERBI has added a graph reading tutorial to help build confidence.
        - A study reported that 70% of the participants were able to read their graphs without the tutorial.
            - The tutorial was more beneficial for participants without a bachelor's degree.
        - DERBI can incorporate different styles of graphs. They have a color block system which can be used when chemicals have specific guideline levels.
    - A large number of participants still prefer to receive their results in paper format. Therefore, any digital interface would need to allow results to be downloaded in a printable format that can also be mailed to participants.

CHAIRS-LA: Community Health and Air Quality Implications of Refinery Retirements in Los Angeles
Presentation: Marinelle Villanueva, PhD Candidate, Environmental Health Sciences, UC Los Angeles

Panel members and the audience discussed the Community Health and Air Quality Implications of Refinery Retirements in Los Angeles (CHAIRS-LA) study with the guest speaker, including:

- The distribution of participants in the three study locations: Wilmington, Carson, and Torrance.
    - Most of the land in Carson is occupied by petroleum refineries, and therefore fewer people live in that neighborhood and were able to participate in the study.

    - The target sample size for Torrance was 30 people as residents in this location are considered to be the positive control population in this study (i.e. there was no change in the number of operating refineries in Torrance).
        - It would be helpful to include a negative control population that does not live near refineries.

- Previous studies that assessed the effect of industry closures on air pollution exposures and human health.
    - A study conducted by UC Berkeley in California has shown that the closure of coal and oil power plants was associated with lower rates of pre-term birth.
    - A study in Canada reported decreased health care utilization as well as reduced ambient concentrations of sulfur dioxide after the retirement of an oil refinery.

- The consideration of additional air sampling in future study years to increase statistical power to detect differences in exposures.
    - Outdoor air samplers are less affected by indoor behavior and may be more reflective of changes in outdoor air pollution.

- The study participants' lived experiences and perceptions of the oil refinery closures and neighborhood air pollution.
    - Questions about participants' perceptions of air pollution are now being included in the year 2 study questionnaire.

- Interpretation of the results from the Fresh Air wristbands worn by the participants.
    - The lab will provide the total concentration of each analyte measured in the wristbands.
        - These values will be adjusted for sample duration as well as the analyte-specific uptake rate.
        - The final values are a time-weighted average which reflects the average air concentration of the analyte over the sampling period.
    - Benzo[a]pyrene is one of the chemicals that will be measured through the wristbands even though it's predominantly in the particle-phase and may have a relatively low diffusion coefficient.
    - Future analyses will examine any associations between concentrations on the wristband with urinary biomarkers.

- Separating the influence of the refinery closure from the decreased use of gasoline-powered vehicles in CA on air pollution exposures.
    - This will be challenging as these factors are interconnected.
    - A substantial difference in traffic-related emissions is not expected between the two years.

- A PAH method, previously presented to the SGP, measures both carboxylated and hydroxylated metabolites of PAHs in urine and could help differentiate between petrogenic and pyrogenic sources of PAHs.
- There are plans to analyze the Fresh Air wristband data for source apportionment.

Open Public Comment

- Dr. Ahimsa Porter Sumchai from the Hunters Point Biomonitoring Foundation presented research on heavy metal and radiation exposures in people who live near the Hunters Point Naval Shipyard, which is a federal superfund site.