

# November 2023 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) was held virtually and at the George Alexeeff Environmental Health Library in the Elihu M. Harris State Office Building in Oakland on November 6, 2023 at 1:00 pm – 4:00 pm. Panel members attended virtually and in person. This document briefly summarizes input and recommendations received from the Panel, as well as the range of topics discussed with the audience. Visit the [November 2023 SGP meeting page](#) to access the presentations, complete transcript, and other meeting materials.

### SGP Panel Members in Attendances

Megan R. Schwarzman, MD, MPH, Chair  
Carl Cranor, PhD, MSL, *attended remotely*  
Lara Cushing, PhD, MPH  
Oliver Fiehn, PhD  
Ulrike Luderer, MD, PhD  
Thomas McKone, PhD  
Penelope (Jenny) Quintana, PhD, MPH  
José Suárez, MD, PHD, MPH

### Update on AB 617 Community Biomonitoring Studies

Presentation: Stephanie Jarmul, MPH, Office of Environmental Health Hazard Assessment (OEHHA)

Panel members discussed the following topics with staff presenters:

- Evaluating the impact of the swamp cooler filters and portable air cleaners (PACs) installed at participants' homes during the FRESSCA-Mujeres study.
  - As there was not a wildfire smoke event during the study period, lower air pollutant concentrations may increase difficulty in identifying a difference between the intervention groups. The Panel emphasized the importance of clear messaging if results show that the difference is not apparent.
    - Though there was no wildfire smoke event, air quality in the San Joaquin Valley remained poor. Air sampling and monitoring conducted should pick up other potential sources of air pollution such as agricultural burning.
  - Additional metrics for evaluating the impact of the swamp cooler filters such as:
    - The energy demand associated with the filter intervention and filter

- performance over time, considering particle removal and air flow.
- Adding assessment of PM<sub>10</sub> data, because visible dust was apparent on filters and participants reported noticeable reductions in house dust after the swamp cooler filter intervention.
    - PurpleAir monitors may not be best suited for measuring PM<sub>10</sub>. The Program can consider other low-cost monitors which may be more responsive to PM<sub>10</sub> for future studies.
    - Scanning electron microscopy (SEM) analyses will help elucidate particle sizes and types in indoor and outdoor particulate matter samples in FRESSCA-Mujeres.
  - Potential for conducting a follow-up to the FRESSCA-Mujeres study, such as:
    - Repeating the sampling protocol next wildfire season to capture the impact of the filters during a wildfire smoke event, which was the original study aim.
      - Building upon existing relationships with community partners and participants, the recent completion of the study's fieldwork/sample collection (October 2023), and the associated momentum could be an efficient use of resources.
      - As Program staff were not the principal investigators (PIs) of the study, an extension/follow up would require support of study PIs and other collaborators, as well as additional funding.
    - Monitoring air quality in the winter, when wood burning is a significant contributor to air pollution in the San Joaquin Valley. Due to lower temperatures, the swamp cooler filter intervention could not be evaluated in this season as the swamp coolers would not be in use.

## **Results from the Stockton Air Pollution Exposure Project (SAPEP)**

[Presentation](#): Susan Hurley, MPH, California Department of Public Health (CDPH)

[Presentation](#): Nina Holland, PhD, University of California, Berkeley

Panel members, staff and guest speakers discussed the following topics related to the Stockton Air Pollution Exposure Project (SAPEP):

- Interpretation of the biomarkers of oxidative stress and inflammation data.
  - Levels of biomarkers of oxidative stress and inflammation can vary by age, body mass index (BMI), physical activity, and diet.
    - Due to the small sample size, a traditional statistical model was not utilized in SAPEP. However, biomarker levels were compared by age and sex.

- The potential combined impact of obesity and air pollution on levels of oxidative stress should also be explored.
- There are minimal published data on these biomarkers for comparison in children and adolescents.
  - Data from the Biomonitoring component of the San Joaquin Valley Pollution and Health Environmental Research Study (BiomSPHERE), which enrolled children and adolescents and their parents, will be available in 2024 and should help to interpret SAPEP results.
  - The Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) Study also collected data on isoprostane.
- Key concepts to communicate to participants and the larger community about SAPEP results:
  - The air filtration was successful in reducing concentrations of PM<sub>2.5</sub> and black carbon.
  - The importance of using the portable air cleaners correctly (e.g., using appropriate settings).
  - If more specific data re: 1 vs 2-naphthol levels in urine are not available in time for a community meeting, indicate that the Program is following up on the naphthol results and will report any meaningful findings at a later date.
- Interpreting the current 2-naphthol results among participants in SAPEP.
  - 2-Naphthol is a metabolite and biomarker of naphthalene. Current 2-naphthol results may include coelution of 1-naphthol. 1-Naphthol is a metabolite of the insecticide carbaryl, as well as a metabolite of naphthalene. Upcoming lab results separating 1-naphthol and 2-naphthol will be critical in interpreting results.
  - The high 2-naphthol results are not likely due to exposure to naphthalene in ambient air. SAPEP naphthalene concentrations were on par with published typical outdoor levels, and those found in other California communities by SAPEP collaborator Dr. Betsey Noth.
  - Consumer products may be a contributing source of exposure to naphthalene.
    - A study published in Environmental Science & Technology looking at volatile organic compounds (VOCs) in consumer product categories from the California Air Resources Board's 2020 Emissions Inventory found naphthalene in 12 categories of consumer products. These include mothballs, general purpose cleaners, paint thinners, and construction materials. However, specific products within these categories were not identified.
    - Program staff investigated other possible exposures that could increase 2-naphthol levels. For example, staff investigated whether azo dyes

such as Sudan 1, which is metabolized to 1-amino-2-naphthol, could be further metabolized to 2-naphthol in the human body, but found no evidence of this. In another example, staff identified an herbicide (naproanilide) that may be degraded to 2-naphthol; however, exposure in the US is unlikely as this herbicide is not used (or registered for use) in the US, and has not been detected in human or animal food by the US Food and Drug Administration's pesticide residue monitoring program.

- Carbaryl exposure may occur through the application of this insecticide in the area.
  - It rained during the study period and there is often a trend of increased use of pesticides during a rainy period. However, the study was conducted in December, a time when insect activity is typically low and crops to which carbaryl would be applied may have already been harvested.
- A community meeting may serve as a forum for information on cultural or general practices which may identify potential sources of exposure (e.g., use of mothballs, household pesticides, etc.).
- The Program could also consider returning to the study's institutional review board (IRB) to follow up with participants with an additional survey regarding naphthalene exposures, or to collect additional urine samples.
- Databases the program should consider reviewing to help identify potential sources of naphthalene or carbaryl in the Stockton area.
  - The panel suggested TRI emissions data, CARB's facility search tool, and the National Air Toxics Assessment from EPA which has high resolution emissions inventories (both roadway and point emissions).

## Plan for 2024 SGP Meetings

Presentation: Stephanie Jarmul, MPH, OEHHA

Panel members expressed support for the Program to consider the following opportunities for future biomonitoring studies:

- Evaluating the impact of Assembly Bill 496 – Cosmetic Safety, which will prohibit the use of certain chemicals in cosmetics starting in 2025.
- Assessing exposures from oil and gas development.

