

## **March 2019 Meeting of the Scientific Guidance Panel for Biomonitoring California**

### **Summary of Panel Input and Recommendations**

The Scientific Guidance Panel (SGP) for the California Environmental Contaminant Biomonitoring Program (also known as Biomonitoring California) met on March 6, 2019 in Sacramento. This document briefly summarizes the Panel's input and recommendations on each agenda item and the range of topics discussed with the audience. Visit the [March 2019 SGP meeting page](#) to access the presentations, other meeting materials, and the meeting transcript.

### **Program Update**

[Presentation](#): Nerissa Wu, MPH, PhD, Chief, Exposure Assessment Section, Environmental Health Investigations Branch, California Department of Public Health (CDPH)

The Panel:

- Discussed Program funding:
  - Acknowledged the Program's ability to adjust to budget limitations and continue to produce meaningful studies.
  - Noted that if a new grant were awarded by the Centers for Disease Control and Prevention (CDC), it would not increase Program resources, and would only replace the existing CDC funding.
  - Inquired about the various trade-offs that must be considered in allocation of limited Program resources (e.g., fewer analytes measured, slower pace of studies).
- Discussed the [California Regional Exposure \(CARE\) Study](#), including approaches used to increase participant diversity and recruitment efforts.
- Provided input on California-specific priorities for potential inclusion in the Program's CDC grant proposal:
  - Maintain statewide surveillance of PFAS exposures, which will be important to inform drinking water standards in California.
  - Measure pesticide exposures
    - Compare pesticide levels in agricultural workers and their families on organic farms versus conventional farms.
    - Evaluate cannabis-related exposures to pesticides and other contaminants or additives for agricultural workers, retail workers, and consumers.
    - Add measurement of pesticides for relevant regions in the CARE Study (e.g., Central Valley).

- Evaluate worker and community exposures to high-use pesticides, such as quinone outside inhibitor (Qol) fungicides and glyphosate. (The need for sufficient resources to develop complex new methods was noted.)
- Study chemical exposures that impact specific California populations, such as:
  - Central Valley communities using rural water supplies (e.g., small water utility systems, private wells).
  - Military personnel and their families.
  - Immigrant populations.
  - Occupational groups relevant to California.
- Conduct studies designed to evaluate the effectiveness of California regulations or programs
  - Track flame retardant exposure levels affected by California furniture regulations, by conducting statewide surveillance of PBDEs and emerging flame retardants as part of the CARE Study
    - Examine potential disproportionate impacts on lower income populations, such as from use of older furniture.
  - Extend the East Bay Diesel Exposure Project to help evaluate the effectiveness of California's diesel regulations.
  - Use biomonitoring findings to help verify CalEnviroScreen predictions.
- Develop capacity to respond rapidly to emergencies
  - Measure polycyclic aromatic hydrocarbons (PAHs), metals, and other chemicals relevant to wildfires in emergency responders and residents
    - Use biomonitoring to integrate across the various routes of exposure to wildfire contaminants, both in the immediate aftermath (e.g., from smoke, dust, fine particulate) and later clean-up phases (e.g., from impacted drinking water supplies).
  - Measure chemical exposures related to heat waves
    - Examine impact of increased volatilization of chemicals on indoor and outdoor exposures.
- Measure exposures to emerging technologies, such as 3-D printers or wearable electronics.

**Background Materials for SGP Member Presentations:** [Selected References](#)

### **Chemicals in the Indoor Environment: Implications for Human Exposure and Health**

[Presentation:](#) Veena Singla, PhD, SGP Member

The Panel and audience discussed:

- Consistency in indoor dust levels of phthalates across households, which suggests

an ongoing and ubiquitous source like building materials (e.g., vinyl flooring, PVC pipes).

- Studying construction workers or other groups who could be highly exposed to chemicals in building materials (e.g., flame retardants, in addition to phthalates).
- Paucity of studies on fragrance chemicals in dust, highlighting the need for more research to characterize exposures to these chemicals
  - Lack of public information on fragrance ingredients poses hurdles for identifying which analytes to target.
- Using a molar-based concentration instead of a simple concentration (e.g., ng/g) as a way to compare dust measurements across different chemical groups.
- Identifying chemicals with the highest concentrations measured in dust across studies, as a way to flag those of greatest concern for health risk.

### **Non-targeted Screening of Marine Organisms and Drinking Water: Newly Identified Persistent Pollutants**

[Presentation:](#) Eunha Hoh, PhD, MSES, SGP Member

The Panel and audience discussed:

- DDT<sup>1</sup>-related compounds
  - Abundance in the California environment, due to prior disposal of these off the Southern California coast.
  - Importance of continued tracking of these compounds, and better characterization of the range of breakdown products.
  - Impact of basing policies, like fish advisories, on only a few compounds (DDE, DDT isomers), because of inadequate data on other breakdown products.
  - Detections of tris(4-chlorophenyl)methane (TCPM) and hydroxy-TCPM isomers in marine mammals and California condors
    - These are important DDT-related compounds that are not typically monitored, and have not been measured in human samples.
    - TCPM and tris(4-chlorophenyl)methanol (TCPMOH) also are reportedly used in the production of synthetic high polymers, light fast dyes for acrylic fibers, and agrochemicals (information from a chemical profile developed in support of their nomination for evaluation by the National Toxicology Program).
- Challenges in non-targeted screening analyses
  - Impact of sample matrix, extraction methods, and instrument choices on which compounds can be detected. A single approach cannot cover all compounds of potential interest.

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<sup>1</sup> Dichlorodiphenyltrichloroethane

- Importance of having controls/comparison samples for interpretation of findings.
- Marine mammals as a sentinel species for persistent compounds, and applicability of blubber analysis methods to human biopsy samples.
- Expansion of non-targeted screening work to non-halogenated compounds
  - Detection of chemicals used as UV filters (sunscreens).

### **Persistent Organic Pollutants: Metabolic Effects and Dietary Interventions to Reduce Body Burden**

Presentation: José Suárez, MD, PhD, MPH, SGP Member

The Panel and audience discussed the pilot study of nut consumption as a way to enhance excretion of persistent organic pollutants (POPs), including the following topics:

- Nuts can act like olestra, a synthetic fat that does not get absorbed and has been shown to enhance excretion of POPs.
- High fat nuts like almonds and walnuts, for which about 20 to 25 percent of calories are not actually absorbed, are most effective in reducing POPs.
- Size of nut particles, and not only fat content, plays a role; nut butters are not effective.
- Nuts are also high in polyphenols, which may alter metabolism and enhance the degradation of some of the PBDEs in particular.
- A subset of nuts in the pilot study were analyzed for POPs to rule out contaminants in the nuts as a confounder.
- Amount of nuts required per day (~3/4 cup) and compliance issues in the intervention study.
- The effectiveness of using nut consumption as a dietary intervention over time, given ongoing exposures to POPs.

### **Shaping Program Priorities – Input from Panel Member Research**

#### Afternoon Discussion Questions

The Panel and audience expanded on the morning discussion, identifying additional priorities for the Program:

- “Inert” ingredients in pesticide formulations
  - These are not the active pesticide ingredient, but are not necessarily biologically inert and may be present as a large percentage of the formulation.
  - “Inert” ingredients are poorly studied, similar to fragrance ingredients.
  - The Program should examine information available from the California Department of Pesticide Regulation, and look for opportunities to study exposures to “inert” ingredients of potential concern.

- Chemical selection activities
  - Quaternary ammonium compounds as the highest priority to screen for possible future consideration as potential designated chemicals
    - Commonly show up in untargeted analyses and appear to be highly abundant.
    - High exposure potential – high production volume, used in many cleaning agents.
    - Known health effects – associated with occupational asthma, sensitizers.
    - Often not very biodegradable.
  - Previously screened chemical classes, like the neonicotinoid pesticides.
  - Fungicides
    - Azoles, such as imidazoles.
    - Qols, such as famoxadone, fenamidone, pyraclostrobin.
  - Additional classes of fragrance chemicals.
  - Classes of chemicals defined through a disease lens, such as chemicals associated with breast cancer or mammary gland developmental toxicity.
  - Emerging chemicals, such as new alternative plasticizers, as the major priority versus legacy chemicals, such as PCBs
    - Legacy chemicals are still important to study to examine distribution of exposures in the population, potential health effects, and mitigation.
    - PCBs can be formed in some manufacturing processes, presenting exposure concerns beyond the legacy compounds.
  - Halogenated compounds
    - TCPM.
    - Other breakdown products or metabolites of halogenated compounds that may not be captured on the designated chemical list.
    - Brominated dioxins and furans, which can be combustion products of concern from a wildfire.
- Occupational exposures to installers of building insulation, such as exposures to flame retardants and isocyanates in spray foam.
- Continuing statewide surveillance
  - Ongoing support for the CARE Study.
  - Option of using banked samples, such as from the Genetic Disease Screening Program or banked breast milk, as an efficient way to analyze for emerging compounds.
- Program funding
  - As one cost-effective approach, make funds available for graduate students to conduct research relevant to the Program. This could include research on

- integrating classic biomonitoring with non-targeted screening, or research on specific compound classes.
- Identifying funding sources to supplement CDC.

