August 2018 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 August 22, 2018 in Oakland. This document briefly summarizes the Panel's input and recommendations on each agenda item and related public comments. Visit the August 2018 SGP meeting page to access the presentations, other meeting materials, and the meeting transcript.

Panel Business

Dr. Veena Singla was sworn in as a new SGP member, appointed by the Senate Rules Committee.

Program Update

Presentation: Nerissa Wu, Ph.D., Chief, Exposure Assessment Section, Environmental Health Investigations Branch, California Department of Public Health (CDPH)

The Panel provided input on aspects of the California Regional Exposure (CARE) Study, including:

- Effectiveness of the recruitment strategies in achieving a sample that adequately represents the demographic of the region being studied.
    - The best ways to reach participants with lower education levels, which included word-of-mouth referrals in LA.
    - Recruitment targets for foreign-born versus not foreign-born status, or preferred language.
    - The trade-offs of recruitment via postcards versus hands-on efforts.
    - The importance of engaging with community partners for targeted outreach.
- Possibility of setting up outreach events that also include the option of sample collection, to facilitate participation.
- Leveraging existing community engagement efforts, such as partnering with groups that are already involved in the AB 617 community air protection program.
    - This could include accessing data from ongoing community air monitoring programs, which might help inform 1-nitropyrene biomonitoring results.
- Considering the impact of a wide age range of participants in interpreting biomonitoring results, such as for metals.

Public comment: Nancy Buermeyer of Breast Cancer Prevention Partners (BCPP) offered to help with outreach to communities as an extension of a statewide project BCPP is currently working on. Ernie Pacheco of the Communications Workers of America asked if those exposed to wildfire smoke will be screened out of the CARE study. (*Program staff*

responded that they are not excluded, and the CARE study questionnaire asks about this potential exposure.)

Biomonitoring California Findings on Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs)

Presentation: Jennifer Mann, Ph.D, Research Scientist, Exposure Assessment Section, Environmental Health Investigations Branch, CDPH
Presentation: Kathleen Attfield, Sc.D., Research Scientist, Exposure Assessment Section, Environmental Health Investigations Branch, CDPH
Presentation: Sabrina Crispo Smith, Ph.D., Senior Research Scientist, Environmental Chemistry Lab, Department of Toxic Substances Control (DTSC)

The Panel, guest speakers, and the audience discussed a range of topics, including:

- How the different mechanism for the persistence and bioaccumulation of PFASs, which is not driven by lipid solubility, could impact interpretation of biomonitoring results for this class.
- Limitations of measuring PFASs in the MAMAS (Measuring Analytes in Maternal Archived Samples) Study, because those biobank samples were collected for purposes of the Genetic Disease Screening Program (GDSP) and not for biomonitoring.
- Assessing the relationship between body burden of PFASs and subsistence fishing.
- Potential pseudo-persistence of short-chain PFASs, which have shorter half-lives.
    - Some data on short-chain PFASs can be accessed at: https://fluorocouncil.com/health-environment/scientific-studies/
- Measuring PFASs in serum versus urine.
- Best practices for interpreting semi-targeted analytical data for PFASs.
- Following up on semi-targeted results and prioritizing compounds for targeted analyses, including the need to synthesize new standards.
- Encouraging analytical laboratories to publicly release their “in-house” databases used to help confirm chemical identity.
- Working to “stay ahead of the curve” to identify emerging chemicals of concern, including PFASs.
- Consulting the list compiled by the Organization for Economic Cooperation and Development (OECD) as a source for identifying PFASs.
    - Be aware of this list’s potential limitations, such as chemicals that do not meet the definition of PFASs or are not commercially important.
- Regulatory improvements for identifying and tracking chemicals of potential concern in current use, such as the recent California legislation that requires labeling of ingredients in cleaning products.
    - Working to build the case for regulating chemical classes.

    - Extending the existing model in California for pesticide use registration to other types of chemicals.
- Considering chemical function, such as the use of PFASs to meet consumer demand for stain-resistant clothing, as one element to help identify and track potential substitutes for chemical classes of concern.
- Approaches for identifying possible future candidate chemicals for biomonitoring:
    - Searching databases like the Chemical Hazard Data Commons by chemical function.
    - Connecting with trade associations, like clothing manufacturers.
    - Mining the newly released consumer product surveys from the California Air Resources Board.
    - Consulting the US Food and Drug Administration's food contact substance notification database, and examining results from recent testing of food packaging.
    - Continuing to track production volume data posted by the US Environmental Protection Agency.
    - Consider chemicals formed when PFAS-containing items burn, and environmental degradation products.

Afternoon Session: Measuring Exposures in PFASs in California- Next Steps

Brief Overview of Session: Sara Hoover, M.S., Chief, Safer Alternatives Assessment and Biomonitoring Section, Office of Environmental Health Hazard Assessment (OEHHA)

Urinary Biomonitoring for PFAS: Pilot Results and Challenges: Presentation by Antonia Calafat, Ph.D., Chief, Organic Analytical Toxicology Branch, Division of Laboratory Sciences, National Center for Environmental Health, Centers for Disease Control and Prevention

PFAS Exposures: Insights from Environmental Data: Presentation by Erika Houtz, Ph.D., Project Environmental Engineer and PFAS Analytical Lead, Arcadis

Guest Discussant Remarks

Presentation: Simon Bălan, Ph.D., Senior Environmental Scientist, DTSC
Presentation: Darrin Polhemus, Deputy Director, Division of Drinking Water, State Water Resources Control Board

The Panel, guest speakers, and the audience discussed a range of topics, including:

- PFASs biomonitoring results for children compared to adults.
- Challenges related to measuring and evaluating short-chain PFASs, including:
    - Shorter half-lives.

    - Exposures that vary in duration or intensity.
    - Achieving sufficiently low detection limits.
    - Using an extraction method tailored to the shorter-chain compounds.
    - Ensuring that appropriate and relevant urinary biomarkers are being measured.
    - Understanding the toxicology of these compounds and the potential levels of health concern.
- General analytical challenges in measuring PFASs, such as the potential presence of PFASs in pipettes and tubing used in laboratory instruments.
- Examining the within and between individual variation in PFASs urinary levels.
- Extent of coverage of the broad class of PFASs in terms of individual chemicals currently being measured in targeted analyses of biological or other samples.
    - Applying non-targeted screening as an exploratory tool to get a better picture of the broader universe of PFASs, including potential metabolites if any, and following up with targeted analyses.
    - Choosing the appropriate analytical approach based on the questions being asked.
- Alternative methods for measuring PFASs, such as the total organic fluorine method, particle-induced gamma-ray emission (PIGE) spectroscopy, and the total oxidizable precursor (TOP) assay.
    - For most samples, the targeted method provides reasonable coverage of the fluorine content; i.e., it is rare to measure a much higher level of fluorinated compounds in an alternative method compared to the targeted method.
    - In some scenarios, however, the alternative approaches provide much better information. For example, these approaches could be useful to evaluate PFASs in a spill of recently manufactured aqueous film-forming foam (AFFF), because current formulations of AFFF do not contain PFASs on the typical targeted analyte lists.
- PFASs in drinking water:
    - Temporal variability in PFAS exceedances.
    - Identifying the sources of those exceedances, which might include discharges from past manufacturing sites, airports, or military sites.
    - Requirement to measure PFOA/PFOS in indirect recycled water projects.
    - Establishing notification levels for more PFASs.
    - Conducting biomonitoring studies in communities impacted by PFAS exceedances.
- PFASs in carpets and rugs as a priority product for the Safer Consumer Products program, which was based on:
    - Major source of direct indoor exposure – large indoor surface area; more than half of California households have carpets, as do many offices and

commercial spaces; and most Californians come into frequent contact with carpet.
    - Large contributor to landfills, a potential source for indirect exposure.
- Examining PFAS exposures from other consumer products, such as personal care products or products from “dollar stores,” which could be important for disadvantaged communities.
- Designing biomonitoring intervention studies for PFASs to examine specific exposure questions, such as:
    - Contribution from dietary sources, including food packaging.
    - Changes in exposures from carpeting, given that some major manufacturers are removing PFASs in response to regulatory trends.
    - Potential impact of removing PFAS-treated carpets from day care centers or preschools.
    - Changes in PFAS exposures associated with chrome-plating as the formulation of the fume suppressants change, including effects on disproportionately impacted groups like workers and neighboring communities.
    - Exposures to firefighters before and after the use of AFFF, and impact of professional cleaning of personal protective equipment (PPE).
- Examining patterns of measured PFAS levels, such as isomer profiles, co-occurrence of PFASs (like short-chain compounds), ratios of certain PFASs, and other approaches for “fingerprinting” sources.
- Continued relevance of measuring the original laboratory panel of 12 PFASs.
    - So far it is very rare to not see the top six most commonly detected PFASs, which are all in the original lab panel, and instead see different compounds.
    - Relevance of the original panel holds true particularly for general population exposures.
    - Broader panel of PFASs, or alternative analytical methods, should be considered when evaluating more specific exposure sources, such as discharges from a new manufacturing facility or releases of AFFF.
- Using resource-efficient approaches to track PFAS levels.
    - Continued use of archived samples, such as biobank samples from MAMAS.
    - Applying non-targeted or semi-targeted methods to pooled samples.