

March 3, 2016 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 3, 2016 in Sacramento. This document briefly summarizes the Panel's input and recommendations on each agenda item and related public comments. Visit the [March 2016 SGP meeting page](#) to access the presentations, other meeting materials, and the meeting transcript.

Morning Session

New Results for 1-Nitropyrene Metabolites in Children and Underground Miners

[Presentation:](#) Chris Simpson, Ph.D., Professor, University of Washington

Urinary Metabolites of 1-Nitropyrene in US-Mexico Border Residents

[Presentation:](#) Vanessa Galaviz, Ph.D., M.P.H., Associate Public Health Scientist, Office of the Secretary, California Environmental Protection Agency

Repeated Measurements of PAH Metabolites in Women—Initial results from a sub-study for [Women's Health and the Environment \(WHE\)](#)

[Presentation:](#) Ulrike Luderer, M.D., Ph.D., Professor, Center for Occupational and Environmental Health, School of Medicine, University of California, Irvine

The morning session included presentations from the guest speakers listed above, followed by a discussion with the Panel, guest speakers, and audience on strategies for studying California communities that are highly exposed to diesel exhaust and other polycyclic aromatic hydrocarbons (PAHs). The primary purpose of the session was to update the Panel and interested stakeholders on the state of the science for diesel exhaust biomonitoring. For information on the previous discussions of this topic, refer to the [November 2014](#) and [December 2008](#) SGP meeting materials.

The Panel, guest speakers and audience discussed:

- 1-Nitropyrene (1-NP) (and its metabolites) as a useful biomarker for diesel exhaust exposure, as demonstrated in studies of miners, children in East

Oakland and US/Mexico border commuters.

- Urinary 1-NP metabolite levels track with other measures of diesel exhaust exposure. For example, levels were two- to three-fold higher in East Oakland children (higher diesel exposure based on traffic measures) compared to Salinas children (lower diesel exposure).
- Strategies for studying diesel exhaust exposure in California, including:
 - Comparing populations near I-580 (no truck traffic) versus I-80 (heavy truck traffic).
 - Identifying other highly impacted communities to study using indicators from [CalEnviroScreen](#).
 - Targeting highly exposed occupational populations, such as diesel mechanics and workers at the Ports of Los Angeles, Long Beach and Oakland.
 - Measuring temporal changes in 1-NP metabolite levels in samples collected before and after the implementation of California's diesel regulations to help assess the public health benefit.
- Other factors to explore, such as:
 - Expanding analyses to measure multiple 1-NP metabolites and other PAH metabolites.
 - Relationships between 1-NP metabolite levels and other indicators of diesel exhaust exposure like ambient levels of 1-NP or black carbon.
 - The pharmacokinetics and intra- and inter-individual variability in metabolism of 1-NP and its metabolites following repeated exposure to diesel exhaust.
 - 1-NP metabolite concentrations in miners increased across the work week, while air concentrations did not increase, suggesting possible build-up in the body.
 - Potential pharmacokinetic differences between children and adults were also noted.
 - Possible contributions from ingestion exposures (e.g., from dust).
 - Seasonal differences in exposure during winter versus summer, and other timing considerations in sample collection.
- Next steps for the Program, including:
 - Conduct an inventory of archived urine samples and evaluate whether it would be appropriate to measure 1-NP metabolites in those samples.
 - Develop Environmental Health Laboratory (EHL) capability to measure

- 1-NP metabolites in urine, with assistance from Dr. Chris Simpson.
- Explore partnerships with community and academic groups for future studies.

Refer to the [meeting transcript](#) for complete details of the above discussion.

Public comment:

Mr. Tom Jacob, with the Chemical Industry Council of California, asked about the use of respirators by the miners and the impact on exposure concentrations. Dr. Simpson noted that respirators and other emission controls were potential confounders for determining the relationship between personal air exposure measurements and 1-NP biomarkers.

Ms. Nancy Buermeyer, of the Breast Cancer Fund (BCF), expressed support for tracking exposures to diesel exhaust, particularly in environmental justice communities.

Dr. Veena Singla, of the Natural Resources Defense Council (NRDC), noted the work of the Santa Monica NRDC office to develop clean air action plans for the Ports of Long Beach and Los Angeles and echoed the importance of studying diesel exhaust exposure in communities near these Ports to examine the effectiveness of emission reduction policies.

Dr. Peter Flessel, former Chief of EHL in the California Department of Public Health (CDPH), suggested considering a marker for low molecular weight hydroxy nitroaromatics as a potential indicator of diesel exhaust exposure.

Laboratory Updates

[Presentation](#): Jianwen She, Ph.D., CDPH

[Presentation](#): Myrto Petreas, Ph.D., M.P.H., Department of Toxic Substances Control (DTSC)

Panel members:

- Discussed the Program's progress on development of non-targeted screening methods using benzophenones as an example chemical class.

- Encouraged the Program to expand efforts to track flame retardant exposures in California by studying levels in children and alternatives to polybrominated diphenyl ethers (PBDEs) including organophosphate flame retardants (OPFRs).
- Discussed the status of method development for 1-NP metabolites.
 - The Program is working to develop this method in consultation with Dr. Chris Simpson, pending EHL staff availability and other resources.

Public comment:

Dr. Singla, of NRDC, highlighted the finding that participants in the California Teachers Study living in close proximity to solid waste facilities had elevated exposure to PBDEs (see Liu et al. 2016¹). She noted that although PBDEs have been phased out, many PBDE-containing products are still in use and thus exposures are ongoing.

Ms. Buermeyer, of BCF, suggested the Program develop methods to measure the flame retardant tetrabromobisphenol A (TBBPA).

Program Update

Presentation: Michael DiBartolomeis, Ph.D., D.A.B.T., CDPH

The Panel:

- Concurred with the Program's current priorities:
 - Continuing to work toward an approximation of a statewide sample
 - Biomonitoring chemicals in consumer products, including conducting intervention studies
 - Integrating environmental justice principles into Program projects
 - Studying children's exposures
- Encouraged the Program to pursue additional partnerships, laboratory collaborations with other researchers, and grant applications as ways to leverage state funding.
- Noted archived samples from the National Children's Study are now available and suggested the Program look into obtaining California samples.

¹ Liu R, Nelson DO, Hurley S, Petreas M, Park JS, Wang Y, Guo W, Bernstein L, Hertz A, Reynolds P (2016). Association between serum polybrominated diphenyl ether levels and residential proximity to solid-waste facilities. *Environ Sci Technol* [Epub ahead of print] doi: 10.1021/acs.est.5b04715. Abstract: <http://www.ncbi.nlm.nih.gov/pubmed/26906616>

- Supported the inclusion of Asian Pacific Islanders in Program studies and encouraged the Program to consider studying other immigrant populations that are unique to California, such as the Chaldean community from Iraq.

Public comment:

Dr. Singla, of NRDC, encouraged the Panel to weigh-in on the importance of funding for the Program with the administration in whatever way may be appropriate.

