November 14, 2013 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 November 14, 2013 in Sacramento. This document briefly summarizes the Panel's input and recommendations on each agenda item and related public comments. Visit the November 2013 SGP meeting page to view or download the presentations, other meeting materials, and the full transcript.

Program Update

Presentation by Michael J. DiBartolomeis, Ph.D., D.A.B.T. *Chief of the Exposure Assessment Section, California Department of Public Health (CDPH); Lead of Biomonitoring California*

Panel members:

- Suggested the Program consider ways to increase the amount of feedback from participants on their experience and understanding of their biomonitoring results, and compare participants' understanding across different studies.
    - One suggested approach for the Firefighter Occupational Exposures (FOX) Project was to communicate directly with union leadership about encouraging firefighters to complete the online survey.
- Asked for additional report-back on Maternal and Infant Environmental Exposure Project (MIEEP), including the planned analysis of participant understanding and the results from analyzing exposure questionnaire data in relationship to measured chemical levels.
- Commented that the Biomonitoring Exposures Study (BEST) is a good step toward achieving a key Program goal of obtaining results for a representative sample of California residents.
- Encouraged the Program to expand the geographic representation of BEST by working with Kaiser or other health maintenance organizations (HMOs) in regions beyond the Central Valley.
- Noted the importance of including non-Kaiser members to ensure inclusion of a broader population, including the uninsured for example.
- Suggested that the Program consider targeting additional demographic categories, such as mixed race, income-based, and those born outside the U.S.
- Suggested comparing the demographics of those who were recruited with the full group of those who received recruitment letters to see if there were major differences.

Public comment:

Davis Baltz of Commonweal commended the Program on the efficient use of resources via the numerous successful collaborations. He stated that getting results to the public,

advocates, legislators, and others is critical to spread the message that the Program is contributing to public and environmental health in California. Mr. Baltz also recommended the Program explore further studies of potential workplace exposures.

Laboratory Update

Presentation by Jianwen She, Ph.D., *Chief, Biochemistry Section in the Environmental Health Laboratory Branch, CDPH*

Presentation by Myrto Petreas, Ph.D., M.P.H., *Chief, Environmental Chemistry Branch, Environmental Chemistry Laboratory, Department of Toxic Substances Control (DTSC)*

Panel members:

- Asked the Program to look further into the sources of mercury in the FOX population.
- Noted some interesting findings about choline metabolism to TMAO (trimethylamine N-oxide), a cardiovascular risk factor, and asked about possible parallels with metabolism of arsenocholine.
- Asked if there were similarities or common exposures identified among the five firefighters who had elevated levels of inorganic arsenic, such as if they were all from the same firehouse. (*Program staff noted that only two of the five could be reached for the follow-up survey; results are still being analyzed but no conclusions can be drawn from this very small number.)*
- Asked about potential interpretation issues that might arise from unavailability of lipid measurements to normalize results for persistent organic pollutants measured for the Northern California Childhood Leukemia Study. (*Program staff responded that this study was an add-on to a larger study on dust and that the purpose was to compare results from the blood samples with results from the dust samples*).
- Commended the Program's work on non-targeted screening.

Potential Designated Chemicals: Selected Aroma Chemicals

Presentation by Gail Krowech, Ph.D., *Staff Toxicologist, Safer Alternatives Assessment and Biomonitoring Section, OEHHA*

Documents:
Synthetic polycyclic musks
Tetramethyl acetyloctahydronaphthalenes

The Panel:

- Unanimously voted to recommend adding "synthetic polycyclic musks" to the list of designated chemicals for Biomonitoring California.
- Unanimously voted to recommend adding "tetramethyl acetyloctahydronaphthalenes" to the list of designated chemicals for Biomonitoring California.

Public comment:

Nicole Quinonez of the International Fragrance Association of North America (IFRA-NA) provided general comments to the Panel. Ms. Quinonez expressed IFRA-NA's interest in serving as a resource to Program staff and the SGP. She noted that IFRA-NA provided information [*such as production volume*] to OEHHA on the synthetic musks. Ms. Quinonez noted that members of IFRA supply 90 percent of the global market for fragrance compounds. She asserted that IFRA has high health and environmental standards for fragrance manufacturing and fragrance ingredients and has restricted or banned 174 fragrance compounds. Ms. Quinonez also highlighted research conducted by the Research Institute for Fragrance Materials (RIFM).

Identifying Novel Compounds in Untargeted Metabolomic[1] Screens
Presentation by Oliver Fiehn, Ph.D., SGP Member and director of the National Institutes of Health West Coast Metabolomics Center at UC Davis

Panel members asked about:

- How the Program might approach untargeted analysis.
  Dr. Fiehn:
  - Commented that screening for compounds containing chlorine or bromine atoms would be the easiest approach. The second easiest class to look at would be compounds containing sulfur atoms.
  - Noted that novel compounds containing phosphorous and nitrogen are more difficult to identify as they look more like endogenous metabolites, such as complex lipids.
  - Suggested that, as another approach, the Program could look at chemicals in terms of their bioaccumulative properties, removing both very lipophilic and very hydrophilic chemicals during sample clean-up.
- The utility of metabolomics for determining a specific biomarker for diesel exhaust.
  Dr. Fiehn:
  - Commented that laboratory studies on animals to identify biomarkers of exposure to diesel exhaust could be conducted.
  - Noted that it would be better to look at a panel of biomarkers for diesel exhaust rather than a single biomarker.

Public comment:

Gina Solomon, Deputy Director for Science and Health for Cal/EPA, asked about the potential for misidentification of chemicals because of the difficulty of differentiating peaks that are very close together. She also asked about the need for purified samples of reference compounds. Dr. Fiehn noted that metabolomics is hypothesis-generating

[1] Metabolomics is the identification and quantification of all metabolites in a given biological situation (from: http://fiehnlab.ucdavis.edu/).

and any findings in a first pass screening have to be validated in a second pass using another method, such as a targeted method. If a targeted method is not possible, for example because analytical reference compounds are not available, then another analytical method could be used to at least confirm the same accurate mass and same MS/MS results. Even if it cannot be determined what the unknown compound is, it can be verified that the compound is present by applying a second analytical approach. He cautioned that before making any claims about finding a novel chemical, the findings must be validated through a different approach. Dr. Fiehn also noted that the National Institutes of Health has funded two centers for chemical synthesis to support identification and validation of new compounds of potential concern.

David Nuber, by electronic mail, asked for clarification regarding the purpose metabolomics will serve for the Program. Dr. Fiehn explained that metabolomics, or more simply "chemical profiling", can be used to identify new chemicals. Non-targeted and class-based targeted screening methods can complement traditional targeted approaches. Metabolomics can be used to examine potential differences in biochemical characteristics in exposed versus unexposed populations. Dr. Bradman noted that metabolomics also can be useful for identifying biomarkers of exposure and effect.

Open Public Comment Period

No additional public comments were received.

Dr. Jenny Quintana raised the possibility of the Program measuring cotinine, a metabolite of nicotine, as a biomarker for active tobacco smoking and secondhand smoke. She noted that measuring cotinine would assist the Program in interpreting data for particular chemicals, such as PAHs and metals, which have been shown in analyses of NHANES data to be associated with secondhand smoke exposure. She requested that this issue be brought back for discussion at a future SGP meeting. The Panel expressed interest in discussing cotinine further and Program staff will follow up on this.