July 14, 2011 Meeting of the Scientific Guidance Panel for Biomonitoring California

Summary of Panel Recommendations

The Scientific Guidance Panel (SGP) for the California Environmental Contaminant Biomonitoring Program (also known as Biomonitoring California) met on July 14, 2011 in Sacramento. The SGP's recommendations and suggestions on various topics are summarized below. Meeting materials, including the agenda, presentations and the full transcript, are available on the meeting webpage.

Program Update

Program staff gave an update on funding status and staffing changes. Updates were given on the Program's ongoing projects: the Maternal and Infant Environmental Exposure Project (MIEEP), the Firefighter Occupational Exposures Project (FOX) and the Biomonitoring Exposures Study (BEST). A brief description of other activities was given: status of the Public Involvement Plan revisions based on public comments and SGP input; the Program's efforts on strategic planning; preparation of reports to the Legislature and to the Centers for Disease Control and Prevention (CDC); and the Program's contributions to the development of National Biomonitoring System Guidelines.

Panel members:

- Commended the continued progress of the Program.
- Highlighted the public health success of the Program in identifying and following up on elevated blood mercury levels in a mother-infant pair in MIEEP and how this case illustrates the value of biomonitoring.
- Noted the importance of conducting biomonitoring projects in specific sub-groups as opposed to just taking a random sample. The source of the mercury exposure was face cream that had been adulterated in Mexico; this exposure may not have been found in a random sample of the general population.
- Recommended sharing the mercury finding with the Green Ribbon Science Panel to highlight the potential usefulness of biomonitoring in helping prioritize green chemistry efforts.
- Suggested partnering with community clinics to follow up more broadly on the issue of mercury in face creams from Mexico.

A public commenter, Davis Baltz from Commonweal, echoed the Panel's praise of the Program's progress and success in identifying and following up on the elevated mercury levels. He noted that this case shows the potential for Biomonitoring California to help

identify problematic chemical exposures. He praised the Program's efforts to develop chemical-specific information aimed at the target populations, such as firefighters. He expressed that the nonprofit and non-governmental organizations (NGO) community looks forward to receiving and publicizing the results of the various projects to highlight the value of biomonitoring in California.

Laboratory Update

Laboratory staff gave an update on activities since the last SGP meeting, including staffing issues and newly acquired equipment. Both laboratories described the status of sample analysis for MIEEP and FOX. The California Department of Public Health (CDPH) Environmental Health Laboratory (EHL) reported on methods under development (metals in urine; arsenic and mercury speciation), under validation (analytes in dry blood spots; hydroxy-polycyclic aromatic hydrocarbons [hydroxy-PAHs] in urine) and in production (including metals in blood; phthalate metabolites; organophosphate metabolites; phenols). The Department of Toxic Substances Control (DTSC) Environmental Chemistry Laboratory (ECL) outlined capability for selected chemicals on the priority list (polychlorinated biphenyls [PCBs]; organochlorine pesticides; polybrominated diphenyl ethers [PBDEs] and additional brominated flame retardants; perfluorochemicals [PFCs]). ECL discussed challenges in measuring the brominated flame retardants and in developing one sensitive LC-MS/MS method for human serum to incorporate a large panel of related chemicals. ECL also described related DTSC projects of benefit to the Program, including pilot work for the California Teacher's Study and for a University of Cincinnati study of maternal serum and cord blood, and a study of flame retardants in household dust for the University of California Berkeley Childhood Leukemia Study.

Panel members:

- Commended the laboratories on their progress and efforts, particularly in view of the decreased number of staff in ECL (due to hiring freeze).
- Highlighted the method in dry blood spots as an important resource for California and the U.S. A suggestion for additional validation of the method was given, involving collecting blood spots and drawing blood samples from adult volunteers and comparing the analytical results from the two collection approaches.
- Recommended prioritizing the list of brominated flame retardants (BFRs) to focus only on the highest priority BFRs for methods development. For example, consider extent of use as a factor. The Panel offered to assist in the prioritization process.
- Noted the importance of weighing new methods development versus sample analysis. While including many new chemicals is desirable, it shouldn't hold up analyzing samples and generating results for the studies in progress.
- Noted that for chemicals in commercial use, there should be a requirement that the capacity exists to measure the chemical and determine whether people are

being exposed. This is a larger chemicals policy issue.

Chemical Selection Planning

Program staff provided an update on chemical selection activities and presented a revised screening approach for candidate designated chemicals that incorporated the Panel's input from the March 2011 SGP meeting. The revised screening approach was illustrated using some organotins as an example. Staff proposed that the screening approach be flexible and iterative, depending on the specific chemicals and research questions.

Panel members:

- Supported the Program's proposal to use a flexible, iterative screening approach, depending on the specific chemicals and research questions.
- Thought the level of detail provided in the example of organotins was appropriate.
- Stressed the importance of trying to get a handle on the market trend of the chemicals – whether production is on the upswing, downswing or at relatively steady levels.
- Suggested combining information on market trend with monitoring data and environmental modeling to try to get a real world picture of what's happening with the chemical.
- Suggested conducting an initial screen on the class as opposed to an in depth look at all the chemicals in that class. Use structure activity information if available.
- Suggested that the Program consider adding benchmark doses, if available from state or federal agencies, to the screening table.
- Supported development of a potential designated document on organotins and suggested the Program further investigate which organotins should be included.

A public commenter, Cheriel Jensen, inquired about the chemicals Roundup, glyphosate and POEA and why they are not on the designated list. Program staff indicated that glyphosate (Roundup) is on the list of chemicals being screened as a possible candidate for designation and that POEA (polyethoxylated tallowamine surfactant) will be added to the screening list as well.

Non-Targeted Screening of Biological Samples for Environmental Contaminants

Program staff introduced Dr. Roy Gerona of University of California San Francisco (UCSF) and San Francisco General Hospital. Dr. Gerona was invited to give a talk on the topic of non-targeted screening of biological samples for environmental contaminants because of the Panel's and Program's interest in this area. Dr. Gerona

explained the importance of non-targeted analytical methods, which allow investigators to identify previously uncharacterized contaminants instead of only targeting known contaminants. He described the analytical methods and gave examples of how these methods have been applied. He also outlined his new study with UCSF researchers to screen serum samples from pregnant women for previously unmeasured environmental chemicals.

Panel members:

- Appreciated the excellent presentation that clearly explained this complex topic.
- Inquired about the limitations of the reference libraries of environmental chemicals, which are needed to carry out non-targeted screening. Dr. Gerona will be working with his colleagues to put together a more comprehensive library of environmental contaminants, as none is currently available. The goal will be to include at least 1,500 chemicals.
- Inquired about how the researcher decides which results to return, whether there is an ethical commitment to return all the results, and other ethical issues such as whether the researcher would be free to analyze samples for drugs. Dr. Gerona explained that these issues should be covered in the submission to the IRB.
- Asked about including both parent compounds and metabolites in the reference library of chemicals. Dr. Gerona replied that the libraries mostly include parent compounds, but software exists to predict Phase 1 and Phase 2 metabolites.
- Noted the potential limitations posed by the extraction methods used on the samples; what is measured could be limited by what can be extracted. Dr. Gerona noted that multiple extraction methods are used to help address this potential limitation.
- Inquired about the sample size needed to run the non-targeted analysis in addition to the targeted analyses already being run by the Program. Dr. Gerona indicated that this depends on the instrument that's used. He also noted that if the same solvent system is used in both the non-targeted and targeted analyses, it shouldn't be a problem using the same sample for both.
- Questioned Program staff about the limitations of the cooperative agreement with the Centers for Disease Control and Prevention (CDC) in allowing purchase of an instrument for non-targeted analyses. Program staff explained that a source of funds other than CDC would be required to support the purchase.

The Panel unanimously recommended that Biomonitoring California should explore ways to use time-of-flight (TOF) mass spectrometry, quadrupole time-of-flight (QTOF) mass spectrometry, OrbiTrap and similar technology for priority setting and confirmatory analyses. The Panel further noted that use of these technologies is the only way to look at some of the chemicals on the Program's priority list because there are no reference standards.

A public commenter, Davis Baltz of Commonweal, inquired about the cost of the instruments. Dr. Gerona responded that the costs are high for these instruments, on

the order of half a million dollars or higher, depending on exactly which instrument and the type of institution buying it.

Panel Discussion of March Workshop on Understanding and Interpreting Biomonitoring Results

Program staff provided an introduction to the Panel's discussion of the March workshop (https://biomonitoring.ca.gov/events/biomonitoring-california-workshop-march-2011). The introduction included a reminder of the workshop's goals and structure. Program staff also briefly summarized some of the workshop highlights in the following general areas:

- Returning individual results - context and uncertainty
- Information on chemical health effects and exposure sources for report back
- Developing levels of health concern
- Evaluating exposure sources and studying early effect markers
- Aspects of biomonitoring measurements
- Informing public health and regulatory actions

Panel members:

- Complimented the Program on a productive workshop.
- Agreed with the summary of workshop highlights presented by Program staff (https://biomonitoring.ca.gov/sites/default/files/downloads/071411Panel.pdf).
- Commented that the workshop in general confirmed that the Program is headed in the right direction on these issues.
- Highlighted the difficulties in interpreting biomonitoring results on an individual level.
- Noted that Program results are best used for setting priorities for protecting the California population and determining follow up research.
- Highlighted the issues with translating risk assessment values into biomonitoring equivalents and the problems with applying those values to individuals.
- Strongly advised against the Program developing levels of health concern for individual risk interpretation.
- Concurred that the Program can use comparison levels that are already available from other state or federal agencies, such as for lead and mercury.

A public commenter, Davis Baltz of Commonweal, reiterated what he considered a clear message to the Program from the Panel and at the workshop that it would be inappropriate for the Program to move into risk assessment or assigning levels of health concern. He suggested that NGOs could play an important role in providing more information on the interpretation of biomonitoring results and having conversations with communities after a biomonitoring study is completed. Mr. Baltz emphasized that the Program's focus should continue to be on generating and publishing biomonitoring data. The Program should watch for special exposures in California and in highly exposed

groups, and track how exposures unfold over time. He noted that this information can be used by the state to evaluate policies designed to reduce exposures

Panel Discussion of Potential Input for Upcoming 2012 Program Legislative Report

Dr. Ulrike Luderer, Chair of the SGP, provided background for the Panel's discussion. Biomonitoring California is required to submit a progress report to the Legislature every two years. Dr. Ed Moreno, who was chair of the SGP at the time, provided a letter in the fall of 2009 that summarized the Panel's recommendations for the Program. These recommendations were included in the 2010 Report to the Legislature. The purpose of this agenda item was to discuss whether the Panel would like to prepare a letter with recommendations to the Program for the 2012 report, and if so, what recommendations should be included. If the Panel was in agreement, Dr. Luderer would prepare the letter based on the Panel's input.

Panel members agreed that Dr. Luderer should prepare a letter with the Panel's recommendations for the Program to be included in the 2012 Report to the Legislature. The Panel also discussed possible audiences for the letter beyond just the three departments (CDPH, DTSC and the Office of Environmental Health Hazard Assessment [OEHHA]), such as the Governor and members of the Legislature.

Panel members suggested specific content for the letter:

- Note importance of prioritizing chemicals for methods development and analysis.
- Include recommendation to pursue methods to screen unknowns and using these methods to help prioritize chemicals
- Strongly emphasize the progress the Program has made by using existing limited funding and obtaining new funding.
- Discuss the successful implementation of the CDC cooperative agreement and the importance of the external funding provided by CDC in building the California program.
- Describe specific Program accomplishments, such as:
    - Success in building laboratory capacity.
    - Carrying out the pilot studies. Include a description of the pilot studies.
    - Success in effectively engaging the public.
- Recommend filling all Program vacancies so the Program is fully staffed at current funding levels.
- When the economy improves, recommend moving toward increasing Program resources with a goal of biomonitoring a statewide representative sample.

A public commenter, David Baltz of Commonweal, agreed with the suggested content for the letter and recommended also including something about how biomonitoring can save public institutions valuable resources. He provided an example of how targeted biomonitoring allowed the state of Mississippi to quickly figure out exactly where a

pesticide had been illegally applied, carry out targeted evacuations, and calm everyone who was not exposed. That one incident saved the State of Mississippi $50 million. He stated that biomonitoring has the potential to save California millions of dollars in avoided healthcare costs, and environmental remediation.