March 16, 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 March 16, 2011 in Oakland. The SGP's recommendations and suggestions on various topics are summarized below. Meeting materials, including the agenda, presentations and the full transcript, are available here: http://www.oehha.ca.gov/multimedia/biomon/sgp031611.html.

Program Update

Program staff gave an update on funding status and staffing changes. A timeline highlighting Program accomplishments since its inception was presented. Various possible strategies for approximating a statewide representative sample were also reviewed. 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). Public involvement activities were briefly described. The release of the Program brochure in English and Spanish was also announced, with hard copies of the brochure distributed at the meeting.

Panel member Dr. Julia Quint suggested developing a formal dissemination plan for the brochure. A public commenter, Carl D. Ruiz, a research fellow at Henkel Consumer Goods, asked that a disclaimer used by the Centers for Disease Control and Prevention be added to the brochure to clarify that biomonitoring measurements are an indication of exposure, not of health effect.

A public commenter, Davis Baltz from Commonweal, commended the program on its considerable achievements to date and reminded the audience that his organization was one of the sponsors of the enabling legislation. He stated that the requests the program is receiving from other parties to analyze samples, marked a significant achievement.

A public commenter, Tony Stefani of the San Francisco Firefighters Cancer Prevention Foundation, expressed interest in the Program broadening the FOX project to include other firefighters from other areas in the state, such as San Francisco. Panel members seconded that suggestion.

Laboratory Update

Laboratory staff gave an update on activities since the last SGP meeting, including staffing changes and newly acquired equipment. Progress in sample analyses and the

development and validation of new methods was also outlined. The California Department of Public Health (CDPH) Environmental Health Laboratory (EHL) described its preliminary success in the challenging analysis of dried blood spots and low-volume specimens for persistent organic chemicals (e.g., polybrominated diphenyl ethers or PBDEs). The Department of Toxic Substances Control (DTSC) Environmental Chemistry Laboratory (ECL) discussed methods development for newer brominated flame retardants (BFRs). ECL also described the testing of different types of tubes for collecting blood samples.

In the discussion with laboratory staff, Panel members:

- Commended the laboratories on their progress.

  The critical support of the CDC in helping develop the laboratory capability, including training Biomonitoring California laboratory staff, was also acknowledged. The fact that outside researchers are requesting that Biomonitoring California laboratories conduct analyses for them was noted as an indication of the importance and success of the Program.

- Supported the Program's intention to develop criteria for which outside projects to accept, to ensure that new projects fit into the overall Program goals.

  These criteria will be important to avoid the laboratories being used simply as service laboratories. Panel members also emphasized the importance of ensuring that the Program has access to the data generated through outside collaborations.

- Suggested that the quality of the filter paper used to collect the newborn dried blood spots might be improved to help reduce background contamination.

- Recommended that the laboratories present summary information on quality assurance/quality control (QA/QC) as part of their presentations.

- Reiterated an earlier recommendation that the Program consider developing methods to screen for unknown chemicals.

  The usefulness of such a method in elucidating complex exposures, such as those experienced by firefighters from a mixture of combustion products, was noted. The increasing number of substitutes for phthalates and plasticizers for which we have very little information on level of use, exposure or toxicity was highlighted as further support for screening unknowns. Having a state reporting system for chemical ingredients in products and the volumes of those chemicals would be another resource for identifying emerging chemicals.

A public commenter, Dr. Dale Hattis of Clark University, suggested the Program also consider analyzing for DNA adducts, for example, as a way of detecting DNA reactive chemicals that have not been previously identified.

Chemical Selection Planning

Program staff presented a proposed screening approach for possible candidate chemicals for designation, based on recommendations by the Panel from the November 2010 SGP meeting. The purpose of doing this screening would be to allow the Panel to weigh in early on chemicals that might be brought forward as potential designated chemicals. The screening approach included elements highlighted by the Panel previously: extent and type of use, indicators of environmental persistence, bioaccumulation and toxicity, and information from past environmental sampling and biomonitoring studies. The approach was illustrated using the example of non-halogenated organophosphate flame retardants.

Panel members gave a number of comments on the proposed screening approach and suggestions for refining and expanding the approach:

- The screen is useful for gathering information on multiple chemicals in a readable format for easy comparison.
- Production volume alone can be misleading: Some low volume chemicals have significant toxicity concerns or concerns for persistence or bioaccumulation. Production volumes can change rapidly once a chemical gets on to the market. A chemical that starts off at a low volume may dramatically increase shortly after being introduced.
- Include information about whether the chemical is a substitute for an existing designated chemical or other chemical of concern.
- Include information on the types and numbers of products in which the chemical is found.
- Indicate some indication of the potential for exposure and likely routes of exposure (e.g., via inhalation, food).
- Overall persistence is a good indicator of exposure potential for a broad range of chemicals.
- Expand the toxicity screen to include some indication of the toxicity concern and extent of information. For example, toxicity concerns could be based on results from many conducted studies, minimal toxicity information or structure activity information. A toxicity concern could also exist because there is absolutely no information. An in-depth evaluation of data quality is not needed, but some indication of what is available would be useful.
- Consider adding reference doses (RfDs), if available.
- It would be helpful to know what chemicals are used in California and in products sold in California.
- Consider adding a notation for very persistent, very bioaccumulative chemicals, which can be a concern regardless of toxicity.
- Using laboratory-based identification of unknowns as a possible screening tool will likely generate long lists of chemicals on each participant studied. Use informatics to identify chemicals that show up most frequently and at the highest concentrations, which could help narrow down the list.
- Add more physical chemical properties to the screen, such as vapor pressure.

- Do not exclude chemicals that are not persistent. We are exposed to many nonpersistent compounds on a regular basis, and even with short half-lives in the body, exposure is still substantial: think about exposure potential.

A public commenter, Dale Hattis of Clark University, recommended the Program consider looking at intake fraction, which better describes exposure potential than volume of use. Intake fraction varies over orders of magnitude, in the same way that persistence varies over orders of magnitude, making it a good screening tool.

The Panel also recommended that the Program prepare a document on aromatic non-halogenated organophosphate flame retardants as potential designated chemicals.

"Biomonitoring Literacy:" Developing Report-Back Materials with Input from Study Participants

Dr. Rachel Morello-Frosch and Holly Brown-Williams of UC Berkeley's School of Public Health presented the work they did on developing a report-back template for the Maternal and Infant Environmental Exposure Project (MIEEP, or Chemicals in Our Bodies Project). Their findings from usability testing with some MIEEP participants were summarized and the improvements to the report back template based on the testing were explained. The primary aim of the report back materials is to address in a readable and accessible way the major questions that participants typically ask: "What did you find? How much? Is it high? Is it safe? Where does it come from? And what should I do?"

Panel member Dr. Dwight Culver inquired about how the "level of health concern" would be chosen and noted the importance of determining appropriate follow up action if high levels are found. Program staff responded that the Program will be deciding on whether a level of health concern has been established and noted that a follow up protocol is already determined for lead and is being developed for certain other chemicals such as mercury.

The Panel commended the extensive work that was done in developing a clear template. They also noted issues that should be considered in using the template and further refining it:

- Providing more information and more resources for participants who want it.
- Looking at ways to indicate that some chemicals vary considerably from measurement to measurement and that a single measurement may not be representative, particularly for non-persistent chemicals.
- Conveying the meaning of finding a metabolite, which could indicate exposure to the parent compound or to pre-formed metabolites.
- Developing information for health care providers on how to interpret the results.

There were three public commenters on this agenda item. Davis Baltz of Commonweal,

noted that in many cases we will need to be prepared to say that we do not know whether a chemical level is high or whether it is safe. He also emphasized that he does not think it's the role of Biomonitoring California to try to decide what is safe. He noted that the main goal of the Program, established in the legislation, is to regularly provide information on chemicals in Californians, both to establish a baseline and to look at trends over time, and that this should remain the focus.

Dr. Lesa Aylward of Summitt Toxicology recommended that the Program include information on breast-feeding when returning results to mothers and also consider providing reference values from NHANES beyond just the average, such as the 95th percentile. Levels can vary widely and this would not be illustrated by the average only.

Caroline Silveira, of Government Affairs at DuPont, suggested clarifying which chemicals have established levels of health concern and where those levels come from.

Kaiser Permanente Collaboration: Biomonitoring Exposures Study (BEST)

Program staff gave an overview of the Program's newest collaboration with Kaiser Permanente Northern California, Division of Research, Research Program on Genes, Environment, and Health (RPGEH). The Biomonitoring Exposures Study (BEST) is a pilot biomonitoring project in the Central Valley, with a recruitment goal of 100 English-speaking male and female adults. Collaborating with Kaiser offers an opportunity to approximate a representative sample, because of the very similar demographics of the Kaiser membership compared to the overall demographics of California. This initial pilot in the Central Valley also expands the Program's projects into a new geographic area.

Panel members' comments and recommendations included:

- Give the Panel the opportunity to comment on the exposure questionnaire to be used in BEST.
- Consider doing some pilot samples to test the integrity of the samples during the overnight shipping.
- Consider collecting blood samples at a patient's regular blood draw, rather than a home visit, to save resources.
- In addition to sending a phlebotomist to the home, consider also conducting a home environmental assessment to look for potential sources of chemicals.

Looking Forward for Biomonitoring California – Program Planning

The Program posed a series of discussion questions (full set of questions are here: http://www.oehha.ca.gov/multimedia/biomon/pdf/032011Discussion.pdf) to the Panel to assist with Program planning, focusing on:

- Identifying populations for community studies;
- Approaches for approximating a statewide representative sample;

- Approaches for investigating environmental exposure sources; and
- Additional input on Program planning.

The Panel's suggestions and recommendations are summarized below, organized by topic area.

Identifying populations for community studies

- Pay attention to children, particularly from birth to kindergarten age. The lowest age in NHANES is age 6.
- Focus initially on building on the two existing successful collaborations – mothers and infants; firefighters – and consider new projects as resources allow.
- Consider populations that might be particularly impacted by toxic exposures, which could pose environmental justice concerns. These could be urban or rural populations.
- Publicize the availability of our laboratory capability and see if external researchers might have resources to collaborate with the Program.
- Conduct outreach to additional occupational groups.
- Consider veterans returning from Iraq and Afghanistan as a population with potentially unique exposures.
- Some Panel members liked the idea of testing incoming medical students, while others raised some concerns. Incoming medical students are not likely to be a vulnerable population and may be less representative of California. However testing this population would offer an excellent opportunity to educate future physicians about environmental health.
- With regard to health care workers as a possible group, it was recommended that this group be broadly defined to include all types of health care workers (e.g., janitorial staff in addition to doctors, nurses, etc.). It was noted that a key exposure for health care workers, particularly nurses, is antineoplastic agents and other drugs. These drugs are not on the designated or priority lists, but if this group were studied, these exposures should be considered.
- Consider major ethnic groups in California not adequately represented in NHANES- such as Asian Americans.

Approaches for approximating a statewide representative sample

- Kaiser is the most promising collaboration for this purpose.
- Consider expanding to the Kaiser population in Southern California.
- Consider adding partnerships with community-based hospitals or clinics that could help fill in the lower income, uninsured portion of the population that would be missed in Kaiser.
- Consider collaborating with the California centers of the National Children's Study. The centers are distributed across the state in rural and urban counties and would capture children as a key group. Some challenges in this possible collaboration were that field work will not start until 2012 or 2013 and there may

be difficulties in adding a collaboration with Biomonitoring California to the protocol.

Approaches for investigating environmental exposure sources

- If this is undertaken, the Program should use both environmental sampling and modeling together. The sampling results can help constrain the modeling.
- Measuring environmental samples is not the focus of the legislation, so the funding would need to come from an outside source.
- Community studies could offer good opportunities to identify environmental exposure sources but that effort should not distract from biomonitoring as the main purpose of the studies.
- Look at existing environmental sampling already being done by other researchers (e.g., the National Children's Study) and the state (e.g., the Air Resources Board).

Additional input on Program planning

- Two Panel members, Dr. Gina Solomon and Dr. Tom McKone, talked about the importance of considering how Biomonitoring California should respond in emergency situations that could arise in California, similar to the Gulf oil spill and the Japanese nuclear accident that followed the recent tsunami. The Program could play a role in developing scientifically accurate information in those situations and be a resource for the public. The Program could help address fears and counter misleading information that might be spread during emergencies like these. This would require having plans in place to get out in the field quickly.

The Acting Director of OEHHA, Dr. George Alexeeff, noted that the state has fairly well developed emergency procedures and suggested that staff involved with these emergency programs could give a presentation to the Panel. This could be a first step in developing a "biomonitoring emergency response plan."

There were three public commenters on the Looking Forward agenda item. Rachel Washburn from Loyola Marymount University in Los Angeles suggested considering nail salon workers as a group to study. This group tends to be Asian urban women of reproductive age, another population which has not been studied well.

Davis Baltz of Commonweal seconded the comment on nail salon workers, pointing to the California Healthy Nail Salon Collaborative as a good point of contact for this group of workers. Mr. Baltz also suggested that the Program consider people who work with cleaning chemicals and agricultural workers. He also agreed with the concept of building on and expanding the mother and infant and firefighter projects as a first step, considering the Program's limited resources. He raised the idea of trying to monitor cord blood on a regular basis. He named a number of fence-line communities who may be appropriate to study: West Oakland and Richmond in northern California, and in

Southern California, the cities of Vernon, Commerce, and areas around the Port of Los Angeles. Mr. Baltz thought some environmental sampling would be useful, such as taking samples of couches since dust that is coming off older sofas is going to be more laden with flame retardants. However, he also emphasized the importance of focusing on biomonitoring. He noted that Camp Lejeune in North Carolina had a spike of breast cancer cases among men, so military bases might be of interest as a follow-on to the idea of looking at returning veterans. Mr. Baltz thought it would be worth offering to biomonitor County Health Officers or the Legislature, as a way to raise the profile of the Program. He also noted an example where the CDC did an emergency biomonitoring study when a pesticide was illegally applied in Mississippi, which helped identify those who were actually exposed and needed to be evacuated versus homes that were not contaminated. So Biomonitoring California could play an important role in emergency response, though there is no funding for that.

Sharyle Patton of the Commonweal Biomonitoring Resource Center brought up the idea of having a way for communities to apply to be biomonitored, instead of taking only a top down approach in choosing them.