MEETING

STATE OF CALIFORNIA

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

ENVIRONMENTAL CONTAMINANT BIOMONITORING PROGRAM

SCIENTIFIC GUIDANCE PANEL

THE CALIFORNIA ENDOWMENT

OAKLAND CONFERENCE CENTER

SEVENTH FLOOR

1111 BROADWAY

OAKLAND, CALIFORNIA

WEDNESDAY, AUGUST 14, 2013

10:01 A.M.

JAMES F. PETERS, CSR, RPR
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A P P E A R A N C E S

PANEL MEMBERS:

Ulrike Luderer, Chairperson, M.D., Ph.D.

Asa Bradman, M.S., Ph.D.

Carl Cranor, Ph.D., M.S.L

Oliver Fiehn, M.S., Ph.D.

Marion Kavanaugh-Lynch, M.D., M.P.H.

Thomas McKone, Ph.D.

Julia Quint, Ph.D.

Penelope (Jenny) Quintana, Ph.D., M.P.H.

Michael P. Wilson, Ph.D., M.P.H.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY:

Dr. Gina Solomon, Deputy Secretary, Science and Health

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Dr. George Alexeeff, Director

Dr. Lauren Zeise, Deputy Director, Scientific Affairs

Dr. Heather Bolstad, Associate Toxicologist, Pesticide and Food Toxicology Section

Ms. Amy Dunn, Research Scientist III, Safer Alternative Assessment and Biomonitoring Section

Ms. Sara Hoover, Chief, Safer Alternatives Assessment and Biomonitoring Section

Dr. John Faust, Chief, Community Assessment and Research Section

A P P E A R A N C E S C O N T I N U E D

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Ms. Fran Kammerer, Staff Counsel

Dr. Gail Krowech, Staff Toxicologist, Safer Alternatives Assessment and Biomonitoring Section

Dr. Laurel Plummer, Associate Toxicologist, Safer Alternatives Assessment and Biomonitoring Section

Dr. Michael J. DiBartolomeis, Chief, Exposure Assessment Section, Environmental Health Investigations Branch

DEPARTMENT OF PUBLIC HEALTH:

Dr. Jianwen She, Chief, Biochemistry Section, Environmental Health Laboratory

Ms. Ying Li, Environmental Scientist III

DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

Dr. Myrto Petreas, Chief, Environmental Chemistry Branch

ALSO PRESENT:

Mr. Davis Baltz, Commonweal

Ms. Nancy Buermeyer, Breast Cancer Fund

Ms. Rachel Kubiak, Western Plant Health Association

Ms. Pam Strayer

I N D E X

I N D E X C O N T I N U E D

P R O C E E D I N G S

DR. PLUMMER: All right. So we're going to go ahead and get started. Just a quick little overview for our panelists of your microphones that are on your table. Right now, they're a -- there's a red light, so that means they're muted. A flashing red and green light also means it's muted. And when it's your turn to speak, just go ahead and push the button that says push right in front and it should turn green. And we'll keep them muted unless you're speaking.

All right. So, George, take it away.

DIRECTOR ALEXEEFF: Good morning. I'm George Alexeeff, Director of the Office of Environmental Health Hazard Assessment. I want to welcome the Panel to our -- and the staff and members of the public here to the meeting of the Scientific Guidance Panel for the California Environmental Contaminant Biomonitoring Program, also known as Biomonitoring California.

I also want to thank the staff for choosing this wonderful venue. It's great. So I want to thank the Panel for taking time out of their busy schedules to advise us on this very important program. And I want to remind everyone that this meeting is being transcribed and is being broadcast via webinar, and remind you all to speak clearly into microphones. There's a microphone

there or there may be one to hand around if members in the public want to speak.

The first thing I'd like to do is introduce two new panel members. Dr. Oliver Fiehn and Dr. Penelope Quintana, who goes by Jenny. So Dr. Fiehn is a Full Professor of molecular and cellular biology at the University of California, Davis. He's the Director of the West Coast Metabolomics Center of the National Institutes of Health, which is housed in the UC Davis Genome Center.

He's performing active research in cancer metabolism, mitochondrial toxicity, metabolic diseases, databases and drug-responses phenotyping.

Dr. Penelope Quintana is an Associate Professor of Public Health at San Diego State University Graduate School of Public Health. She has an M.P.H. from San Diego State University and a Ph.D. in Environmental Health Sciences from UC Berkeley. She has a research focus on exposures to children and vulnerable populations at the U.S. Mexico border.

So I'd like to administer the oaths to the new Panel members. So I'll stand and they can stand as well. And I will read this and you'll repeat --

MS. HOOVER: Mic.

DIRECTOR ALEXEEFF: Oh, hold the mic. Is this okay like that?

MS. HOOVER I think so.

DIRECTOR ALEXEEFF: Okay. So I guess you'll -- well, I think you're fine there.

Okay. So, I --

PANEL MEMBERS: I --

DIRECTOR ALEXEEFF: -- do solemnly swear or affirm --

PANEL MEMBERS: -- so solemnly swear or affirm --

PANEL MEMBER QUINTANA: Repeat that?

DIRECTOR ALEXEEFF: Yes, please repeat that.

Should we take two. Okay, solemnly swear of affirm.

Okay. I'll make a statement and then you repeat. That I will support and defend the Constitution of the United States --

PANEL MEMBERS: -- that I will support and defend the Constitution of the United States --

DIRECTOR ALEXEEFF: -- and the Constitution of the State of California --

PANEL MEMBERS: -- and the Constitution of the State of California --

DIRECTOR ALEXEEFF: -- against all enemies, foreign and domestic --

PANEL MEMBERS: -- against all enemies foreign and domestic --

DIRECTOR ALEXEEFF: -- that I will bear truth faith and allegiance to the Constitution of the United States --

PANEL MEMBERS: -- that I will bear true faith and allegiance to the Constitution of United States --

DIRECTOR ALEXEEFF: -- and the Constitution of the State of California --

PANEL MEMBERS: -- and the Constitution of the State of California --

DIRECTOR ALEXEEFF: -- that I take this obligation freely --

PANEL MEMBERS: -- that I take this obligation freely --

DIRECTOR ALEXEEFF: -- without mental reservation or purpose of evasion --

PANEL MEMBERS: -- without mental reservation or purpose of evasion --

DIRECTOR ALEXEEFF: -- and that I will well and faithfully discharge the duties which I am about to enter.

PANEL MEMBERS: -- and that I will well and faithfully discharge the duties which I am about to enter.

DIRECTOR ALEXEEFF: All right. Thank you.

PANEL MEMBER FIEHN: Well and faithfully discharge the duties which I am about to enter.

DIRECTOR ALEXEEFF: All right. Okay. So I'd

like to give a brief overview of our last Scientific Guidance Panel meeting. The last SGP meeting was held in Oakland, on April 11th, 2013. At that meeting, the Panel heard from two guest speakers, Dr. Linda Birnbaum of the National Institutes of Environmental Health Sciences and Dr. Heather Stapleton of Duke University. They spoke about NIEHS strategies in biomonitoring, and low dose exposures, and new findings on flame retardants in biospecimens, dust, and consumer products respectively. The Panel discussed the implications of the guest speaker's research for Biomonitoring California.

We received Program and laboratory updates, including some recent biomonitoring results, and the Panel provided input. We viewed a demonstration of the new Biomonitoring California website, and provided initial impressions.

Unanimously -- the Panel unanimously voted to make three classes of chemicals priority chemicals for the Biomonitoring California. Non-halogenated aromatic phosphates, p,p´-Bisphenols and Diglycidyl Ethers of p,p´-Bisphenols.

The Panel provided suggestions on possible candidates for future consideration as potential priority chemicals. And for more information on the April meeting, please visit the biomonitoring website at

biomonitoring.ca.gov.

So a couple points about logistics. The restrooms are located out either of the doors. I guess there's a door there, left or right, past the reception desk, and down to the right, right down the first hallway.

Now, in case of an emergency, there are emergency exits. Go out the door on my right where you entered, and follow the green exit signs to the stairwell.

So I'd now like to turn the meeting over to Dr. Luderer.

CHAIRPERSON LUDERER: Thank you, Dr. Alexeeff.

All right. Well, I'd also like to welcome everyone, all the members of the public who are here, the Biomonitoring California staff, and the members of the Scientific Guidance Panel, and welcome our two new members, Dr. Fiehn and Dr. Quintana.

So I'd like to briefly review what the goals are for -- the Panel's goals are for the meeting. So we will receive updates on the Program and the laboratory activities and provide input on those. We'll have a discussion with two guest speakers this afternoon about CalEnvironScreen and biomonitoring. And finally, we'll also consider a screening document on four pesticides as possible candidates for biomonitoring, for designation in California in the future, and provide input on those. And

we'll hear a short update on other chemical selection activities.

So for each of these agenda items, there will be time for Panel clarifying questions, time for public comment, and then also time for Panel discussion and recommendations.

I wanted to briefly review how we'll handle the public comments. So if a member of the public would like to make a comment, they should please fill out a comment card, which can be obtained from the table near the door where you came in. And please turn the cards into Amy Dunn. Amy, could you -- Amy is at the table at the back raising her hand there.

And if you are not at the meeting in person, you're also invited to provide comments via email. And Biomonitoring California staff will then provide those emailed comments to me, and I'll read them here at the meeting.

So to ensure that the meeting proceeds on schedule and that all commenters have an opportunity to speak, we'll take the total time allotted for public comments and divide them by the number of people who wish to speak, and we'll equally divide the time.

So please keep your comments during the day focused on the specific agenda item that we're talking

about. And then there will be an open public comment at the end of the day, in which a member of the public can bring up any topic related to biomonitoring that they wish to bring up.

I also want to remind everyone to speak directly into the microphone and please introduce yourself before speaking. And this is for the benefit of people who are listening via the webcast, and also for our transcriber.

So the materials for the meeting today were provided to the Scientific Guidance Panel members, and they were also posted on the Biomonitoring California website. There are a small number of handouts available on the table, and one sample Scientific Guidance Panel folder, and also a sample results return packet for viewing at the table near the entrance.

We'll take two breaks today. One at around a little after 12 for lunch, and another around 3:20 this afternoon.

And so now, I'd like to start with today's agenda. It's a pleasure to introduce Dr. Michael DeBartolomeis, who is Chief of the Exposure Assessment Section, the California Department of Public Health. And he's the lead for Biomonitoring California. He's going to provide us an update today on the Biomonitoring California activities.

(Thereupon an overhead presentation was presented as follows.)

DR. DiBARTOLOMEIS: Well, good morning, Panel, and good morning people who are behind me. And I realize -- I guess I'll be the first one to comment about how awkward this is going to be all day. And then welcome to these -- those people who are on the webcast.

Oh, thank you.

DR. PLUMMER: Sorry.

DR. DiBARTOLOMEIS: Thank you. So we're going to -- what I'm going to do is go through a general overview of the Program in terms of some updates, and then it's going to be followed by the laboratory updates, which are going to be more in-depth and you will see some new results today as well, so a little teaser, so you don't leave.

What else can I do? Dance a little.

(Laughter.)

DR. PLUMMER: No, sorry.

(Laughter.)

DR. PLUMMER: Just bear with me.

DR. DiBARTOLOMEIS: Okay. We are now up.

DR. PLUMMER: This is your advance.

DR. DiBARTOLOMEIS: All right. Thank you. Thank you, Laurel.

So this is also awkward for the panelists who have to kind of look behind yourself or I guess you have copy of the slides. Great.

Okay. So --

DR. PLUMMER: It's not awkward.

DR. DiBARTOLOMEIS: It's not too awkward.

MS. HOOVER: It's fine.

DR. DiBARTOLOMEIS: So the -- I'm going to cover a little bit of staffing. We're going to go through the projects that are the biomonitoring projects. We're going to bring up a topic that has probably been visited a couple of times over the past five years, but I want to give an update on where we are with the results return, and just talk a little bit about some of the challenges, and then a little bit of website news.

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DR. DiBARTOLOMEIS: So first, in terms of staff changes, unfortunately we have to say farewell to Dr. Sandy McNeel. She's retired, and we're going to really miss her. And Sara Encisco, who was with the Environmental Chemistry Laboratory. And -- but we're welcoming Xirui Wang, Yu-Chen Chang, and Meredith Anderson to the Biomonitoring Program. And actually Xirui has -- really has been here, but she's switching contracts or something like that. Did I have that right?

DR. SHE: Yes.

DR. DiBARTOLOMEIS: So let me just dive right in. Back in April --

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DR. DiBARTOLOMEIS: And what we're going to do is show you where we were last at the last meeting and then what's changed between -- in the last few months. So where we were. We had just completed analyzing the second set of chemicals, returned -- we returned results, analyzed, and were involving analyzing. So where we are now is that we have returned the second set of results. We're still analyzing the hydroxy BDEs. We're close to being done with that. And we added onto this slide, because we had forgotten to add this before, that we have a third set of results we need to return, but that's just the hydroxy BDEs.

So I'll just give you a chance to look at that for a second.

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DR. DiBARTOLOMEIS: In terms of lab analyses, we are nearly completion -- nearly done with all the laboratory analyses with the hydroxy BDEs in the sort of final stages of being QA/QC'd, et cetera. And I just want to also give kudos to the Program staff and to our collaborators at UCSF and UC Berkeley, I believe, with the

paper -- a case study that was published from prior -- several -- a few years ago, with respect to elevated mercury levels in a woman who was exposed to mercury and skin lightning creams. And there's a whole bunch of material on the website, et cetera, if you're interested in taking a look at.

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DR. DiBARTOLOMEIS: Oh, and I think -- did we put the papers up? Are there reprints up there on the table? No. Okay. So, sorry.

Our second project back in April, we were doing -- this is the firefighters study. And this is where we were in terms of we were analyzing and returning second set of results. And we have now completed that, so we have actually returned the second set of results, which is actually a fairly hefty packet. And we are still involved in evaluating and reviewing data. And we are still on track to analyze the participant understanding of what the information they get in their packets.

And in terms of laboratory analyses, we are all complete. So that's nice.

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DR. DiBARTOLOMEIS: Moving into our Central Valley biomonitoring exposure study. We had -- we were just had -- just returned the -- returned just the first

set of results at the last meeting. We have -- are really still in the process of analyzing the second set of results. We hope to be completed sometime in November, I believe.

And so there you are, where we have -- phthalates are still -- actually have progressed to being in the review process. We have several other panels that are underway. We do want to point out that we've -- in discussions with the principal investigators, which is Kaiser Permanente, and because of some concerns with respect to the analyses where we are right now with the DAPs, we decided to remove them from this study for now, to be considered later, if we decide to add back in for future studies. So those have been removed. Now, we might hear a little bit more about that from the lab people, I don't know.

Okay. So now I want to get into something that's --

(Thereupon music through the sound system.)

DR. DiBARTOLOMEIS: Yeah, we're kind of hearing some music here.

--o0o--

(Laughter.)

DR. DiBARTOLOMEIS: So for those of you who are new to the Program, and for those of you who have sort of

put it -- put on hold this whole process of getting results back to participants, I wanted to just raise this again, from a lot of different perspectives. One is sort of how we've done so far, and then also to talk a little bit about what we still face in terms of challenges.

So again, it's required in law that those participants who request to receive their results as part of our biomonitoring studies, that they receive them. And they need to be provided in an easy-to-understand format. So up-to-date, we have provided results for over 95 analytes that have been returned to the participants of the MIEEP and the FOX studies.

And part of the packages include fact sheets. And we have 20 fact sheets for -- related to, for example, chemicals, analytes, possible health concerns, or for -- that include recommendations for reducing exposure. Fifteen of those fact sheets have been translated into Spanish.

And these are -- this is a lot of work. So I just wanted to -- it looks like, wow, okay, nice numbers, but this is a lot of work.

And we also have project-specific documentation. And I'm going to show you a couple of examples on the next couple of slides. But because of the questions that the participants might be asking or those who are from the

outside looking in as to why are you doing these studies, we think that we need to provide also very specific fact sheets for different projects.

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DR. DiBARTOLOMEIS: So in terms of the -- oh, you know what? These are -- did this go out of order? Oh, sorry, I hit the wrong button.

Okay. There we go. So, for example, this is just an excerpt from our, "Why Are We Studying Firefighters", fact sheet. I don't expect you to read that, but just to give you an idea. Then we have something that's specific to a chemical. So, you know, why are we studying parabens for example, or why are we looking into them? And then another one on organophosphate pesticides. All this information you can get off of our website, I believe.

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DR. DiBARTOLOMEIS: Okay. So what exactly have we done over the past few years in terms of returning results?

So if you look at this arrow, those that we've completed FOX round 1, we have the MIEEP round 1 Pilot BEST round 1, FOX round 2. And then MIEEP 2 has just been completed a couple months ago. And now we're working on getting the MIEEP round 3 and the FOX -- well, FOX was

also -- FOX round 2 -- I'm sorry, FOX post results survey. I actually -- I'm not exactly sure what that is. I'll ask -- if you have a question about that one, I can have can have Duyen come up and talk about that, because she's in charge of all this.

So I just wanted to say so this -- in terms of a period of time, that's a lot of work in a less than two-year period of time to get these results back. So it's been crammed into a short period of time.

So that is -- gets me into the segue into what are the challenges. And this might open up some interest for the panels to, you know, to think a little bit about this and maybe have a little discussion.

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DR. DiBARTOLOMEIS: The first obvious challenge for anytime you're returning results is translating what is complicated science into language that people can understand, no matter what language they speak, because most likely you're returning results to people who don't understand or don't have Ph.D.'s in toxicology or epidemiology. And so this is a common problem anytime you're creating outreach material, but you -- and you're trying to cram it into a short period of time, this is very difficult to do.

The second bullet is really the nuts and bolts of

the results return packages, because you have to organize the information in such a way that it's understandable that there's a flow to it. It wouldn't help just to throw something into a package and say here it is. And that tends to -- because of the results return -- the number of return of the analytes we're analyzing, it tends to result in a lot of information crammed into something that you're hoping that people will be able to read and understand.

So there's a little bit of that challenge of how do you avoid information overload. For anybody who's ever done an evaluation of outreach materials, you realize that there's a point of diminishing returns when you have too much.

The paradox is with the third bullet is that there is some information that we have -- where we have a very -- there's a scarcity of information. For example, what do the levels of a chemical in your body, what does that mean for your health and what does that mean for a population's health?

So we don't really have a lot of that information for many of our chemicals. Some are very obvious. We know much about lead and we know much about mercury and we can even put fingers on, you know, exactly -- you know, point out exactly what levels are of concern. But for most of our analytes, that's not going to be the case.

So the paradox here is you have information overload possibly on one side. On the other side, some questions that the individual might really want to know or a population would want to know, we might not be able to answer.

And then the fourth bullet, again, difficult for any outreach materials, is how do you evaluate whether the participants are understanding the material and are getting the message that we're trying to present. And then the 5th bullet is a very simple word, but a very difficult thing, timing.

That's built -- there's a lot of things built into timing, not the least of which is because it takes a long period of time to assemble these packages and create materials, often there is a lag time of it could be years from the time that you're having your biomonitoring and your -- you've given your specimen to when you actually are getting your results. And that's problematic obviously for obvious reasons.

There's also timing in other ways. You know, simply put, there are other factors that can be involved with creating materials if just the science itself is not stagnant. So if you have -- you might have some materials that are outdated fairly quickly, depending on the progress of science.

So there's really kind of a lot of issues with respect to timing, which leads us to the last bullet, which is just about on everybody's slide, when they talk about challenges, which is, you know, our resources and the cost to do this.

So I'm not going to dwell on that, because I think that's pretty obvious. But it does -- it is very resource intensive to create materials such as this.

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DR. DiBARTOLOMEIS: And then moving onto the very final good news. Those of you who have -- who've probably been following, you know that the website was launched, our new improved website. It was launched on July 3rd.

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DR. DiBARTOLOMEIS: And I believe there -- about a week later, there was some announcements, et cetera. And just to remind you of what the new website -- and if you haven't been in there, I really recommend you do. You do go in there, because it is really fun to go through.

We have actually expanded and provided more details on each of the biomonitoring projects. There is more information on the chemicals being measured, a user-friendly biomonitoring guide, and additional materials in Spanish.

And then the last, and certainly not least, we

have now started posting results. So as of today, we had results posted for the MIEEP study and the teacher's study, which is actually a laboratory collaboration.

Thank you.

And we might have in the next day or two some MIEEP -- some new MIEEP results.

MS. HOOVER: FOX returns.

DR. DiBARTOLOMEIS: No, it's MIEEP.

MS. HOOVER: They're on yesterday.

DR. DiBARTOLOMEIS: Are they up?

Okay. Well, there you go. Okay. So that's what -- I didn't know they've officially been on it.

MS. HOOVER: Yes.

DR. DiBARTOLOMEIS: Okay. So thank you. So they are officially on. So we have some MIEEP results 2 are up. So take a look at that. And then in the near -- very near future, we'll have the first set of FOX results posted.

We are also in the process of -- we've contacted several PIs for different laboratory collaborations that I'm just not going to run through them all. But we're really ramping up our effort to get results posted. And I think you're going to see in the next couple of months a ballooning of results on our website. So we're really excited about that. I would say by November we're going

to be in -- you know, being able to report that we have most of our results up hopefully.

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DR. DiBARTOLOMEIS: And I want to just rethank those on the website development team who are listed here.

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DR. DiBARTOLOMEIS: And then finally, I had to show -- we're about -- this is about a third of us, maybe. I don't know. We're such a great looking crew.

So I just want to say thank you, and I'm sure there will be some questions.

CHAIRPERSON LUDERER: Thank you very much, Dr. DiBartolomeis. Okay. My light was flashing, but now it seems to be green, so everyone can hear me, I hope.

All right. I'd like to, first of all, just commend the Program for this amazing job on the results return document condensing all this complicated technical information and -- into, I think, a very understandable document, and also including the information about possible health effects and ways to reduce exposure. So I'm sure other Panel members will have comments and thoughts on that as well.

So we have -- the way we'll be organizing the next few minutes of the time for discussion is first there will be some time for clarifying questions from the Panel,

then we'll have time for public comment, and then we'll have additional time for Panel discussion.

So do any of the Panel members have clarifying questions?

Dr. McKone.

PANEL MEMBER McKONE: So I just want to go back to the portion of clarification and comment about the interpretation of the information. I actually think that's -- you know, the fact that with lead, right, we know. You come in. You have a blood lead level. Your doctor can tell you what it means if, you know, they just look it up.

And I think one of the -- the issue that there are -- there's two things. Almost any chemical in commerce, particularly those that are in consumer products, are going to be in your blood at some level. That's just chemistry. There's persistence. And, I mean, there's actually you can show that anything we use is in parts per trillion levels in lipids all over.

And so the question is what is -- you know, this what does it mean, is actually quite important, particularly for the media to interpret this, because I -- you know, I think there the interpreters offer the public, and I've met many people from the media who think finding something is the same as finding the harm. And, you know,

we don't know that yet.

And actually, that's why we're doing the Program, right, is to get -- I mean, you can't figure out where harm is unless you're monitoring what goes on.

So I think that's still a challenge to communicate. And quite how we do that is going to be something that takes some resources. I mean, that's just sort of my thought on this, because I've experienced a lot of difficulty explaining to people who should know well, right, even what it means when you find a hundred different chemicals in your blood at part per trillion type levels.

It's a comment more than anything.

DR. DiBARTOLOMEIS: Yeah, thank you for the comment.

CHAIRPERSON LUDERER: Dr. Cranor.

PANEL MEMBER CRANOR: Yeah. Something of a follow up to Tom's question. Are the group results posted for FOX or MIEEP or whatever on the website, so you can see there were a hundred people and here's the range we found in their bodies and that sort of thing?

DR. DiBARTOLOMEIS: Well, for the most part. It really depends on what results we're posting, because some studies are small enough where we might not be able to put frequency of detection, for example, because you might be

able to identify an individual based on that. But for the most part, you'll find a least geometric mean ranges, confidence, you know, intervals, et cetera.

PANEL MEMBER CRANOR: Okay. And then for the participants, they can get individual results.

DR. DiBARTOLOMEIS: They will get their individual, if they request it.

PANEL MEMBER CRANOR: In looking --

DR. DiBARTOLOMEIS: In the mail, not on the website.

PANEL MEMBER CRANOR: Right, of course. In looking over the FOX results, something -- I had the thought that may not -- I talked to Lauren a little bit about this -- that may not be appropriate for individuals, but it might be appropriate for groups. We now know from research that some of the people in this room have participated in that exposure to several chemicals may affect the same endpoints. And so the cumulative effects maybe more worrisome than individual effects for a particular substance. And it might be useful for the Program to think about whether to post worries of that sort, at least for group results, probably not for individual results until you have more detail, where you know that you have endocrine disruptors through pesticides endocrine disruptors through PCBs, the brominated flame

retardants, whatever, and have concern where you've got cumulative exposures for people that participated in a study at the group level at any rate.

DR. DiBARTOLOMEIS: Yeah. Thanks, Carl. Let me just make a quick comment, just -- it's not really a response per se. But one of the things I forgot to mention is that, you know, when we're posting -- we're posting the results up on the site without any interpretation at all. They're just numbers. Obviously, people can -- including us, can take that information and compare to a control population or to a -- like an NHANES population, whatever, and that will tell you something about those numbers, but it doesn't tell you if NHANES -- we have -- across the nation, we have high -- not high, but if we have measurable levels of chemicals in our blood, that's already for chemicals that don't belong there. I mean, they just -- there's no physiological reason for them to be in your body, then they're already starting at a level that's above zero, let's say.

And then if you're comparing to that population, your new population, having equivalent levels to what's the national level doesn't mean that you're not healthy or healthy, but it -- you know, if you're above it, that tells you that there's potentially some exposure that is specific to that population, to those individuals.

And that's essentially what this biomonitoring program right now is focusing on is, you know, what can we learn about a population relative to let's say, you know, like the norm, but it doesn't tell you that the norm is necessarily good or bad. And so I think there are a lot of different layers. That's all I really wanted to kind of comment on. There are many layers and interpreting all of these results is compounded by those layers, but you really do bring up a very good point about cumulative impact, which would mean, once again, you know, risk assessment tends to look at one chemical at a time --

PANEL MEMBER CRANOR: That's what worried me, yes.

DR. DiBARTOLOMEIS: Yeah, but in this case, you know, we have evidence that there is exposure to multiple chemicals, and, you know, we're only looking to a very small number of the number of chemicals in commerce obviously. So we -- so that interpretation is something that you're absolutely right is something that we have to, as a scientific community, focus on.

PANEL MEMBER CRANOR: Right. I was just -- one thought that I had at the previous meeting was that the Biomonitoring Program, in many respects, is not terribly health protective. It may be health protective of subcommunities when you can identify you've got hot spots

and that sort of thing, but you could move in that direction by saying, gee, you know, we see people that are subjected to cumulative impacts here, and that's of concern, and begin to say something about that, that the program might push in that direction. I don't know what the complexities are.

CHAIRPERSON LUDERER: Dr. Wilson.

PANEL MEMBER WILSON: Thank you, Dr. Luderer.

I want to underscore Dr. Cranor's point. And in looking through -- you know, reading through the results from the FOX returns, I thought they were, you know, very clear and very well written. I thought, you know, it was -- that the interpretation was really helpful in the way that, you know, you placed them in the context of the study itself, and then across sort of the national data and so forth.

And the two things that kept coming back to me, particularly as I went through to the end of the document, was, you know, the single chemical focus, and, you know, acknowledging that we -- it's really impossible to say, of course, what does it mean when you have all of these all together, all functioning, you know, in one person's body?

But I think it might be useful to say something about it, because that was the question mark that sort of kept coming as the -- you know, to me as I read through

each one, in particular the section on, you know, what are possible health concerns for each one individually. So I think it's -- you know, it's obviously difficult to make a sort of -- a conclusive statement about what the implications are of cumulative exposures, but to -- I think it would be helpful in returning results, and also on-line to acknowledge it and to say something about it in the best way that we can. That was sort of one thought, and again underscoring Dr. Cranor's point.

And the other was that -- and you can, you know, see what you think of this. But the other thought that came to me, as I was reading through it was I wanted to know that the Program -- four different questions. The Program looked for the following substances, which you was in -- that was in here.

Of those, we found this subset, that's number two. Number three of those, we didn't find these and we didn't look for these. You know, we didn't look for -- the fourth one is sort of we didn't -- in other words, it's not a comprehensive scan, you know, of course. And so just to in sort of the opening material around, this represents a subset of what we looked for and what we didn't look for. Does that make sense? Am I making sense there?

Thank you.

(Laughter.)

DR. DiBARTOLOMEIS: Well, we'll definitely consider what you're saying in terms of -- especially the part about how do we explain that we're limited to what we're -- what we can measure right now. It doesn't mean that necessarily that this is -- this is all you have or what -- you know, what -- or that we can't really talk about something that's -- it's a big unknown. I mean, that's the problem.

PANEL MEMBER WILSON: Right. I guess, you know, I felt confident that you could say that.

DR. DiBARTOLOMEIS: We'll have to figure that out.

PANEL MEMBER WILSON: And the way that you put this together was really effective and I thought you could say something very, you know, clearly about what you just said, that this -- yeah, this is a subset. We didn't look for the whole universe, and, you know --

DR. DiBARTOLOMEIS: If we're looking for the whole universe, we would need about 400,000 laboratory people.

PANEL MEMBER WILSON: Exactly. I'm just -- what I'm just saying is sort of putting in context for the person reading those results. And then something -- some interpretation on the point of cumulative exposure.

Thank you.

DR. DiBARTOLOMEIS: Thank you.

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: You know, if your comment is directly at this, I'll just wait.

PANEL MEMBER QUINT: I don't know. It's somewhere between everybody's comments, so go ahead.

PANEL MEMBER BRADMAN: I just wanted to comment about, in the presentation, you mentioned the issues of resources and cost. And I think that's an important one. I know in many, like federal, grants and other competitive grant programs, my experience is that resources for returning results and the time involved in that are often -- they're undervalued, and they're often not available, and it's often done kind of as an extra thing. And I think it's a great thing about this program that it's written into the law.

And I think it's important to try to document what those expenses are, and also to, at least from my perspective, not undervalue those resources, just because I think returning results for people participating in studies where that is intrinsic to the project, it's important that it be done well, and that they be available. So, again, I think it's important to understand the full expenses and think about overall

resource allocation.

But then at the same time, we should really value those resources and value the touch factor, so to speak, and figure out how to make it efficient but also valuable.

DR. DiBARTOLOMEIS: I agree.

CHAIRPERSON LUDERER: Dr. Quint.

PANEL MEMBER QUINT: Yes. Julia Quint. I just wanted to kind of comment again on Dr. Cranor's and Dr. Wilson's point about cumulative effects. I was struck with the FOX returns, how many of the chemicals impacted developmental -- had developmental toxicity. So often having talked to people about chemical exposures, when I was working in the Department, your concern often is greater for children than yourselves.

So I think two things in terms of being able to provide additional -- I don't think -- you did a great job in terms of what you communicated and how you communicated it, because translating complex information into simple language and being succinct is very, very difficult.

But I'm wondering if there are other resources. You know, usually with these -- when you're in this position of having to communicate this kind of information, it's important to have additional resources that people can go to to follow-up. In terms of the FOX study, which is an occupational study, I was wondering if

the CDH program, the Hazard Evaluation System and Information Service, which does have a statewide helpline, whether or not some communication with them about the study, what you've communicated. And since they talk to workers exclusively a lot about chemical exposures, at least educating them in case they get those calls or talking to them about having them as a resource to help with some of the interpretation down the line.

And the second point is that people often -- and I don't know if this has been the experience with biomonitoring, but if you get a result and you have something in your body, you get information on health effects, your health care provider is usually a resource that you would likely turn to.

And there is the Program on Reproductive Health and the Environment within UCSF is trying to reach out to health care providers and, you know, medicine -- the people who are involved in people's -- caring for people's health about environmental exposures. So some link or something to some of their -- to their website as a resource for physicians, because they may get some of these questions, and not know anything about biomonitoring or the Program.

So a resource maybe on the website that might be -- and that's a lot -- that may be a lot of work, but a

resource for, you know, the medical providers, and introducing them to this whole area of biomonitoring. And, you know, some education there, I think might be good, if, you know, that can be another thing to add to the to-do list.

But as many people as we get, you know, in the broader community to understand, you know, about environmental health science to begin with, because it's so poorly understood, in terms of medical providers, and down the line, you know, we're finding things in people's bodies, to try to help educate a little bit about that would be great.

DR. DiBARTOLOMEIS: Just two quick responses to those. One is, you know, as head of the Exposure Assessment Section, we actually do go back and forth with occupational health branch on phone calls that come in, but not specifically necessarily to biomonitoring. So you did raise a good point, and I'm going to bring that one back, and talk about -- you know, bring OHB a little bit more and share some of this.

And then the second part, you know, actually Dr. McKone mentioned something about everybody -- all doctors know what lead toxicity is or whatever. In actuality, that's not true.

(Laughter.)

DR. DiBARTOLOMEIS: And so that just sort of emphasizes how difficult what Julia -- what Dr. Quint is saying, and that is, educating physicians on what chemical effects could be, both occupational and non-occupational is very difficult. There's a whole program for pesticide training, for physicians, and for -- you know, so it's just a really complicated and, again, resource intensive thing, but extremely necessary. So I agree with that and we'll have to think a little bit more about how to possibly do that with our limited resources.

CHAIRPERSON LUDERER: Dr. Quintana.

PANEL MEMBER QUINTANA: Hi. This comment and question has to do with accessibility and interpretability of the results to the participants. And so I received your very nice book, which I want to commend you and your staff on.

So the first question they have is about visuals. It's a little short on visuals. And I was just thinking about if you have a kid and they take the STAR test -- most of you might have seen these for your kids -- they have a little bar graph on the first page, you know, all the different kinds of reading and math. And you can quickly see what you're going to get on their case about. You know, it's very easy to see that.

But the same could be true for these. If I have

a giant book, I kind of want to flip to the one that came up higher first, you know, in terms of prioritizing. And I'm not sure if that could be made simple when you have so many subsets of chemicals. It might not be -- it might be difficult.

DR. DiBARTOLOMEIS: Okay. That's an organizational thing that we can come back and think about.

PANEL MEMBER QUINTANA: And then also, it might be nice to have a little summary in the front. In general, everything was pretty low, except for this one class or something like a doctor might tell you.

And then the second question I have for the Panel and for you is in terms of how the person might interpret them. Have there been any discussions of not just putting NHANES data, but maybe even breaking it down, for example, a very well known exposure, smoking. Because some of these things are higher in smokers. And if someone is trying to interpret it and they say, oh, my cadmium is high let's say in my urine, let's say. In smokers, it tends to be high, they would have a feeling of where they were relative to a smoker or if they're a smoker, maybe that helps them interpret it.

And I was just curious if that had come up. I'm sure with a very small sample size that if you start

breaking out smokers, you might worry about identifying people in your summary results, but -- so not just looking only at the NHANES, but pure smokers. Here's a not random sample of occupational people, just to kind of put in perspective, so people can realize that even though NHANES might look high, it's way lower than occupational exposures. And they might feel better, because I assume you want to err on the side of reassurance.

DR. DiBARTOLOMEIS: Well, I guess my response at this point is that I am relatively new to the Program, so I -- and I can probably say pretty surely that there has been discussion in the past about what to include and not to include in terms of comparisons and interpretations or whatever.

I do know that I was participating in the decision not to put interpretation on the website. So it's something that I'm going to have to go back and, you know, kind of find out what is the history of this discussion, because, you know, you raise some good questions there. I just don't know, at this point, how to respond. So it's something I can come back to at a future meeting.

PANEL MEMBER QUINTANA: Thank you.

CHAIRPERSON LUDERER: I just want to take a moment here and see if we have any public comments. We

have 10 minutes for public comments, and then we can come back to additional panel discussion.

MS. DUNN: Yes. We have two public comments in the room, and none on the website yet -- I mean, from the website yet, but they could still come in.

CHAIRPERSON LUDERER: Okay. Well, assuming we have only two at the moment then, we'll allocate five minutes to each one of those.

And the first commentator is Mr. Davis Baltz from Commonweal.

MR. BALTZ: Good morning, everyone. Davis Baltz from Commonweal. We're an NGO in Bolinas, California. We've followed this program carefully since its inception, as we were one of the co-sponsors of the bill that created the Program along with Breast Cancer Fund. I'd like to welcome the two members of the Panel, and note that for the first time in, I think, over a year, we have full complement of the Scientific Guidance Panel, so that's heartening to see.

I also want to compliment the Program on the new website. It looks really good, much improved, and also thrilled that there's some results that are starting to be posted and more on the way.

So I want to just talk for a minute about the results return. As you know, this -- as Dr. Bradman said,

this was written into the bill. We felt that it was important for participants who were giving blood to get the results if they wanted them.

So this is a feature of the program that the program has had to grapple with and respond to. So thank you for all the effort that you've put into that.

I've looked at the stuff on the website on the results return, and we -- I think maybe over a year ago there was an actual workshop that the Panel convened to talk about results return. And I think the point was made then, which I agree with, people who participate in the study and request the results are expressing an interest and a commitment to hear what was in their bodies. So I appreciate that you don't want to have information overload, but for people who are requesting their results, they're demonstrating an interest and a commitment to do their best to understand and to follow-up, if they have additional questions. So I would not err on the side of including less information because you feel people won't understand it. They can follow up and find out more, if they want. If they're requesting the results, they want to know.

And in that light, I think it would be useful, while I understand the disclaimers that you need to post about we find this chemical in your body. It doesn't mean

that it's going to cause an adverse health effect. I think it would also be worth it to include in that information that some of the chemicals that were found in your body have actually been identified as hazardous by Authoritative Bodies and list those Authoritative Bodies as the National Toxicology Program's list of carcinogens or you want to have it more narrowly focused on Prop 65 California type of lists. This is important because these chemicals, as we all know, have gotten into people's bodies and they don't belong there. And if it's a carcinogen or reproductive toxicant or something else, endocrine disruptor, I think people deserve to know that.

And so I would be interested maybe -- it could be off line, but if Michael DiBartolomeis or someone else on the staff could, in the slides, say it was ongoing to analyze participant understanding, I'd be curious to know what sort of lessons have been learned as that analysis has been going on. And what percent of people who are giving biospecimens to be tested are actually requesting the results? Is it 10 percent? Is it 50 percent or more? Dr. Bradman has had a lot of experience with that with CHAMACOS, and so I think that would be interesting information to hear about.

And then finally for this comment, this segment, as kind of the elephant in the room, FOX is, you know,

progressing well, MIEEP is nearly done, BEST is coming along, what's next on the horizon? Are there additional data sets that have been identified where the program could do some analysis, and/or how does this pertain to the Program's budget, and what kinds of activities are planned in the near future to keep these results coming, so that communities, and NGOs, can use the information for their organizing and education about chemical contamination of the environment and humans.

So thanks a lot.

CHAIRPERSON LUDERER: Thank you very much.

I'll have our next -- I was going to see if Program staff might want to address some of those questions that were asked just really.

MS. KAUFFMAN: Hello. Duyen Kauffman. I'm the results return coordinator. And to answer Mr. Baltz's question about how many participants request their results, it's between 90 and 100 percent of our studies. So people are very interested.

And also to just expand a little on what Dr. DiBartolomeis was saying earlier about FOX and the post-results evaluation, we currently have a 14 question on-line survey that we mailed to about 90 percent of the FOX participants. We didn't have email addresses for all of them. And we mailed that out about a -- sent that out

a month after results were returned, the round 2, which was a considerable packet, as you can see. And we have, to date, nine responses. So it's still open. We did have a two week sort of window and we're leaving it open, and hoping to get more responses.

CHAIRPERSON LUDERER: Dr. DiBartolomeis.

DR. DiBARTOLOMEIS: And let me also respond to Davis's question about what we're going to be doing in the future. First of all, the BEST -- where are you?

The BEST project we're now reporting on -- we're talking about the pilot part of it, but there is an expanded BEST, and we're actively recruiting, and we're moving along there, so that's going to be an expanded study. We also have -- I can't talk about any details, but we do have some collaborations lined up for some, at least, laboratory collaborations, and perhaps also some cohort work. So I hope to be able to expand on this at a future meeting.

CHAIRPERSON LUDERER: Thank you.

Our second public comment is going to be from Nancy Buermeyer from the Breast Cancer Fund.

MS. BUERMEYER: Thank you very much. And I always hate going after Davis, because he always says about three-quarters of what I'm going to say.

(Laughter.)

MS. BUERMEYER: But I'm going to say it anyway.

I'm Nancy Buermeyer with the Breast Cancer Fund, and I also want to welcome the new Panel members, thank the Panel for your great work on this really important project, and thank all of the fabulous staff for the work they are doing, not only in doing the actual analysis, but the results returns and the new website. All of it is really, really critical work.

And as Davis mentioned, the Breast Cancer Fund worked with Commonweal to create this program, and we are really, really excited about what you all have done with it, so thank you very much.

I also wanted to mention the importance of the returns. I know it has created some challenge for folks, but we also think it is a critical part of the process, which is part of why we wanted it written into the law.

But I do think documenting what the costs are, so that we know in the future how to sort of build that into projects would be a really, really helpful exercise.

And we're also hoping that as we do these enormous projects, and you do the 20 fact sheets, which I've talked to some of the staff about how challenging that can be, but as those get done, the resources will lessen in the future, because we're testing a lot of the same chemicals and a lot of the different cohorts. And so

hopefully updating those with new science will be less complicated than writing them from scratch. So we hope that as we get better at this, or more to the point, as you all get better at it, the resource allocation will somewhat lesson.

And I know part of the challenge is, you know, what do you tell people about chemicals that we don't know very much about?

I really liked Davis's idea about listing the sort of Authoritative Bodies that have shown hazard from these chemicals. You know, the reason we chose them is because there's some concern about them, right? Like, we didn't pick chemicals that we thought were fine or we wouldn't have looked for them. So being able to talk about what that hazard is and trying to explain a little bit between hazard and risk, I think, is something that people want to know and can know.

And I also wanted to comment on the importance of the cumulative exposures. You know, I work in -- a lot in Washington to try to get chemical policy reform. And we're fighting just to get aggregate, which you guys sort of test intrinsically, because whatever is in your body you got from whatever sources. But, you know, even that is hard to do in Washington D.C. And so for the science to take that next step and look at what are the cumulative

effects, I think, is going to provide us with really important information for the future.

And I just want to go back to part of why we think that the data results is so important, and the work itself is so important, is that we, as an organization, do use it to try to change the law. And, you know, I just got from D.C. testifying about reforming the Toxic Substances Control Act and having information about what people's exposures are is a really critical piece of the story we have to tell. We have to be able to say that, yes, these chemicals get into people because we'll hear something different from many in the chemical industry.

So it's really, really important. And populations like firefighters and pregnant women are exactly the populations we need, as an advocacy community, to put forward. They're very, very sympathetic individuals. We need them to be speaking in their own voice. And so having the results returns and educating them about the concerns, you know, educating them about what's in their body and allowing them to sort of articulate that in their own words in terms of their concern can help us get some of that data that Dr. McKone was talking about, in terms of needing to know, okay, what is the harm?

You know, like, we know some of the hazard, but

not enough, because we don't test these chemicals, but how do we get the voices up there to force the issue to get the data we need to know exactly what these levels mean, and to know whether the quote unquote normative levels doesn't necessarily mean they're safe, so let's go find out what those normative levels mean and look at vulnerable populations, which have a disproportionate exposure to a lot of these chemicals.

So I just wanted to mention a couple of forward-thinking things that aren't directly related, but might be of interest. You were talking before about educating doctors around these issues. We just -- there was a -- there's a bill that would add information about environmental exposures to a maternal brochure that gets handed out by the states to pregnant women. And it just passed the Health Committee. And I'm sorry to say I don't know if it's the Assembly or the Senate, but it is in California. But it did pass unanimously, so that bodes well for getting at least some of those informations into the brochures that go to pregnant women, which will, I think, drive the education of physicians, because they're going to have to be able to answer questions about what's in the brochure. So hopefully that will move forward and become a statute pretty soon.

And I also just wanted to mention thanks to the

California Breast Cancer Research Program, that we're about to work with Dr. Morello-Frosch from UC Berkeley on a biomonitoring program of women firefighters in San Francisco. There have been a number of reports of breast cancer in a young healthy population of women firefighters, and we're looking at doing a biomonitoring program funded by CBCRP to look at some of the kind of chemicals that you all are talking about to do both the firefighters and the control group.

So we're just getting started on that, but hopefully -- I don't know if that's something that we will be coordinating or working with the Program on, but obviously it will add to the body of data that's important. And they are fired up to talk about why they need chemical policy reform. So that's exactly what we need.

So thank you again for all of your work, and I look forward to the rest of the meeting.

Thanks.

CHAIRPERSON LUDERER: Okay. Thank you very much for both of those comments. We don't have a lot of time left here, because we need to move on to the next item, but I know Dr. Cranor had a comment and we have -- Dr. Cranor.

PANEL MEMBER CRANOR: I'll be quick. In terms of

interpreting results, there are various sources that one could consider. This is for Michael and the Program. You have hazard identification. You have some risk assessments out there, and you have even fewer standards. But where you have those for particular substances, you might well think about whether there was a way to include those, either in group results, probably not in individual results, as a way of understanding what's going on.

And if you want numbers, you have Prop 65 numbers as well for a very large number of chemicals. So you might think about those as possibilities for group result interpretations at a minimum.

CHAIRPERSON LUDERER: Dr. Kavanaugh-Lynch.

PANEL MEMBER KAVANAUGH-LYNCH: Thank you.

I'm struggling with how to bring this up, but I'm intrigued by the fact that we're talking about the effort in cost of reporting results, which is just an integral part of the program. But that was not brought up for the actual biomonitoring. It was not brought up for the website. So it's almost as if, oh, by the way, we need to tell you this is really hard and really expensive. Almost in the light of like maybe we should consider dropping it is what I'm hearing in the background or something. I'm like why is -- why is that -- the cost effort of that piece being brought out when the cost and effort of other

pieces are not brought out equally?

So I don't hear anybody saying to drop it, but I want to be careful about how we talk about it and think about it, because it -- just by the way we're talking about it, we are highlighting it as a potential to be paid attention to in a negative way.

CHAIRPERSON LUDERER: Dr. DiBartolomeis.

DR. DiBARTOLOMEIS: I know that you probably expect me to respond in someway. Actually, that's not -- that was not the purpose of my slide. It was just to point out this is a very large chunk of work, and it's very important, and we're not going to drop this obviously. For one thing, it's mandated.

But in terms of, you know, it's -- the Program itself has many, many different components to it. And to work to have all these pieces work in synch and to get everything done is very resource and cost -- so I was bringing it up for the whole program. It's just -- you know, this is -- this is impactful. As Dr. Bradman and other people have said, this is a very important, but very difficult thing to do. And resources is staffing, too. I mean, you know, you have staff who are being spread out in different places.

So I did not mean, in any way, to say that this is even remotely something that we would not do. So I

just wanted to be clear of that.

PANEL MEMBER BRADMAN: Yeah, I just want to clarify too that I wasn't trying to single it out. Rather, I think the direction of my comments was that it's very important to value the process of returning results. And I think historically in research environments, it's been neglected. And that when we think about the cost for per sample analysis, for a chemist, for a data analyst, at the same level we should think about the cost for the health educator or person who's going to be involved in developing the materials and return them. And they should be on equal par.

And understanding what the costs are I think are a way of valuing them, and not creating -- you know, a line-item cut. So at least that was my intent in my comments.

CHAIRPERSON LUDERER: Dr. Wilson.

PANEL MEMBER WILSON: Thank you, Chair. This is just a very practical question about the section on the FOX results around the actions that firefighters can take to protect themselves from chemical exposures on the job. And there are a number of others that I could think of that -- and I'm wondering if the -- that are sort of -- that could be of practical use to firefighters. And I'm wondering if there's an opportunity for putting additional

information out, either in print form or on the web in that area.

MS. HOOVER: Hi. Sara Hoover, OEHHA. Just to respond to a few things and this in particular. We have plans for resources specifically directed at workers on the website. So we'd be happy to take your suggestions. The same for physicians. We're planning resources on the website for physicians. I also want to just note, I realize that for the two new Panel members, the results return is coming out of the blue a little bit.

Just to clarify, we had a very large team of staff working on this for many years. OEHHA led the chemical-specific information and DPH led the remaining of the materials, and we had usability testing. And so this packet has sort of evolved and developed over a long period of time with intermittent workshops and discussions with the Panel.

So that's sort of the context for this big book that you received. But I just wanted to say that I really appreciate the new perspectives and the ideas of, as you read through what are the little pieces that maybe aren't coming through. So we definitely will take those into account for the future.

And I also wanted to just note that all of the effort that's gone into developing the chemical fact

sheets, in particular, me even reassigning other staff from other programs to work on those, has really paid off on the website. So now we're able to get double duty.

So I think that it's been of great value. It's been a really interesting and difficult experience to pull it off, but we feel very committed to the results return and think it's a critical part and a very special part of this particular Program.

CHAIRPERSON LUDERER: Dr. Wilson.

PANEL MEMBER WILSON: Thank you. Thank you very much, Sara, wherever you went.

(Laughter.)

PANEL MEMBER WILSON: I think you're behind the podium.

(Laughter.)

PANEL MEMBER WILSON: I'd like to just list off five different things that -- for consideration by the Program in this section on ways for firefighters to protect themselves from chemical exposures that I think are relevant.

One is develop strategies to avoid respiratory exposures to combustion products during overhaul.

Two is fully decontaminate after returning from a structure fire or vehicle fire, showering and so forth.

Three is using diesel exhaust extractors in the

fire stations.

Four, avoiding contact with diesel exhaust, as much as possible, during emergency runs.

And five is placing turnout equipment outside dormitory areas.

And I would add a sixth, which is a little more nuanced, but that's evaluating the use of cleaning products, solvents, and so forth that are used in the stations on a daily basis, as part of sort of a total approach to reducing chemical exposures on the job.

Thank you.

CHAIRPERSON LUDERER: All right. We're following a little behind schedule here. So I know we need to move on. I just -- one thing I just wanted to highlight is that a lot of the Panel members, as well as members of the public who commented, brought up the importance of trying, in someway perhaps, to address cumulative impacts. And one thing that struck me is already I think that really is a subtext in all of these result return materials, particularly because you grouped chemicals. Many of those groupings have similar mechanisms of action. And so that might be a place where one could start to address cumulative impacts is, you know, saying, for example, PAHs or phthalates. You know, many of these within each of those categories have similar known toxicity. And so that

exposure to multiple of these chemicals from this group may have cumulative impacts. That might be a way where you could start to educate people about that.

Does anyone else have any -- Panel members, any quick final wrap-up comments?

Okay.

All right. Well, then we will move on to the next topic, which is the laboratory update. And I'm going to -- I'd like to introduce -- it gives me the pleasure to introduce Dr. Jianwen She who's the Chief of the Biochemistry Section in the Environmental Health Laboratory Branch at the California Department of Public Health, who will be speaking first, followed by Dr. Myrto Petreas who is the Chief of the Environmental Chemistry Branch in the Environmental Chemistry Laboratory in the Department of Toxic Substances Control.

So Dr. She and Dr. Petreas will provide updates of the -- about those respective laboratories' activities.

Dr. She.

(Thereupon an overhead presentation was presented as follows.)

DR. SHE: Good morning and welcome, members of the Panel and the audience. And I'm Dr. Jianwen She, Chief of the Biochemistry Section of the Environmental Health Laboratory Branch.

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DR. SHE: Today, I will provide an update for EHLB. This include some recent staff changes, project sample analyses status, and some MIEEP study results, and also how to identify unknowns or untargeted analysis, try to provide work flow and our future work.

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DR. SHE: Since last SGP -- oh, sorry, I think I moved too quick.

First, I would like to take this opportunity to congratulate and welcome a few new lab members. Dr. Simon Ip. He was APHL fellow working with us. And now he is in a State-funded biomonitoring position. He's currently working on hydroxy-PAH method. Also, he helped developed the low volume blood method. We try to use microliter volume of blood to do the analysis, and also dried blood spots method.

Xirui Wang and Dr. Yu-Chen Chang are both under the CDC funded Biomonitoring California positions. Xirui is working on perchlorate. And Dr. Chang is working on the Automated SPE -- Automated Sample Process -- basically on-line sample process and analysis to enhance throughput.

Both Xirui and Dr. Chang I think are in the audience. Would you please stand up, so we can welcome you? This is Dr. Chang and Xirui.

Thank you for the hard work.

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DR. SHE: Since last SGP meeting, we have submitted all result to EHIB for the FOX project. The boxes shaded in green indicate that analysis is complete, and the data results have been submitted to EHIB. The boxes in light green, or shaded, indicate that either the samples are currently being analyzed or the data is under review.

The lab has diligently been working on the Pilot BEST sample analyses, that is shown on most of the right columns. Analysis is complete for creatinine, phthalates and OP. This data is currently under review. We are working on completing the other analyte panels. Please note that the samples are only analyzed for speciated arsenic if the total level is above 20 ppb. We aim to release this data to EHIB by the end of summer.

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DR. SHE: Next few slides, I try to show some preliminary results from the MIEEP study. So this is the phthalate result, where we compared the geometric mean with the NHANES studies. We actually analyzed six analytes. One is not shown here, which is mCHP, because the detection frequency of this compound is roughly four percent in the cohort. Now, you can see the other five

the detection frequency is about at least 91 percent.

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DR. SHE: This is a graphically comparison of the same data set. NHANES data is from 2005 to 2006 pregnant women only. You can see we do not notice a significant difference between the two data sets.

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DR. SHE: This slide shows the comparison between the hydroxy-PAH from the MIEEP study and the NHANES study. The NHANES data set is from the same year and the same population groups.

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DR. SHE: This slide graphically shows the difference -- the comparison between the NHANES data and the MIEEP data. Visually, you may notice a qualitative difference between the data sets and we are also researching this further, especially like 2-naphthalene and then 9-fluorine and maybe also 1-pyrene, we noticed some difference.

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DR. SHE: The phthalate and the PAH results presented here are based on preliminary analyses. As you can see from the slide, MIEEP and NHANES have different study designs. These differences must be considered when comparing results. For example, MIEEP participants were

pregnant women who sought prenatal care at a public hospital, whereas NHANES is a nationally representative survey that include a subset of pregnant women.

The demographics for these women are also different. MIEEP participants were all from urban areas, and over 70 percent were foreign born. On the other hand, NHANES sampled a small number of pregnant women who were both from urban and rural areas. The small number of pregnant NHANES participants makes it difficult to subset by race and ethnicity, while still having enough statistical power to draw a conclusion.

Although the study designs are not alike, the difference between the phthalate data set is smaller than the difference between the PAH data. We need to do further statistical analysis and the source analysis to elucidate why the difference exists.

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DR. SHE: In the next few slides, I tried to show -- I change the topic to do the unknown identification as today we are discussing like Dr. Cranor talk about, cumulative toxicities. First, we need to know maybe the cumulative chemicals in the body. So the measurement of these different chemicals maybe not need 400 different labs, as Dr. Michael D. mentioned. So we -- I know screening maybe helps this, so we can reduce the

number of labs to do this work.

I wanted to propose a work flow. This is work that Professor Zhu and I published in 1988 in the Analyst. At that time, we called it ASES, Automatic Structure Elucidation System with Mass Spectrometric information.

The work flow exactly reflected the knowledge we know at that time. Technology changed, so we may need to modify this work flow to serve our purpose here, but here I showed the original work flow.

So when you run chemical with a full scan, you get a spectrum of the different peaks. And when different peaks show up, we do a library search. But as we noticed, this chemical can be accumulated together. That means it's a mixture.

So basically, people try to take notice of peaks or we do reverse library search. So to solve this mixture match the way the library -- the library is a pure chemical. The spectrum you run in the real world is a combination of the peaks. So that's similar of the toxicology issues, how we're dealing with this mixture. So we originally we did some and we said we could do a reverse library search.

If that's a good match, we said, okay, this chemical be identified. So we evaluate it and then the program stopped.

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DR. SHE: But what happened if we don't have a good match? And then we needed to do a -- that's an Automatic Structure Elucidation System come in. So then the program ASES uses a we called it expert system. Expert system based on some knowledge of the mass spectrometer and the chemical features.

For example, chemical have isotopes, we use the isotope profile. And we also use a chemical breakdown in the machine that have certain rules, the neutral losses. These losses of the small pieces depend on chemical structure stability.

And then different class of chemicals of different characteristics, so we call the rules of ion formation. With all of this knowledge, we're able to say, okay, maybe this molecular weight is this so big. So we identify the molecular weight of the chemical first, based on certain rules. And then we go forward and find the molecular formula which gives us the element composition, so we know the composition of the chemicals, based on our other set of rules.

And then further, we do a spectrum simulator to evaluate this formulation we get to see if that's a match with the simulators.

And then we do a structure evaluation, go back to

see, okay, if I said this chemical have this structure, can this structure give me this kind of structure?

If that's matched, we give a list of candidate. This is the algorithms we developed some years ago. And so that's -- with today's new instruments, we tried to make some more improvements and then solve these unknown identification issues, because the unknown identifications beyond to solve the accumulated chemical exposure to identify them. Also, we think the early warning system to show which chemical may be in the human body.

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DR. SHE: Just for example, we list the three rules. So in 1993, we continued to further develop these rules. So the first rule, we set the isotope pattern profile. So in 1993, I used C++ program example for the chemical exact mass and isotope profile. So when we run the spectrum, we can compare with it.

So here is an example. I put PBDE 47. That has 12 carbon, 6 hydrogen, 1 oxygen, 4 bromine. So I put it into the program. The program will show, okay, for the PBDE 47, you needed to find a peak at 481.7152. The last column, we show the relative frequency. For example, you see, compare -- that's a group of peak 481 for 483, 485, 487.

On the last column, I will show the intensities

17, 68, 100, and 65. So that gives you an idea this profile, this chemical may have bromine or halogen elements in it. And then if you find it like this, then the mass spectrometer will show you exactly for all those peaks this profile should match.

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DR. SHE: As I mentioned, technology changed from 25 years ago, and the new machine is available. For example, this one machine we purchased is Exactive Plus with our own budget. Like Mike mentioned, we always have a resource cost issue. We have a limited budget. We only are able to afford to buy this machine, which can give our -- give us accurate mass measurements. And then we also plan to buy new software. We do not need it to develop everything ourself, because's that costly and maybe not productive.

Our developer does help us to understand it, so we wanted to buy commercial software collaborated with other people that already have their own database, for example.

So a few software we listed here. For example, Tracefinder, Mass Frontier, list of libraries or other specific libraries to help us to do this unknown identification.

So the machines are right now under installation.

We expect by next meeting, I hope our facility management can get all of the gas line and the power ready, so we can do some work on it.

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DR. SHE: For the future, we hope Dr. Chang will help us to finish the validation on-line SPE method to improve sample throughput. And also with on-line, on-line is a closed system, we hope we can also avoid the contamination issues of some chemicals, because we use as a -- for example, phthalate, the environmental phenols, they use for personal care products. So the contamination issues, we sought on-line SPE method may also help to eliminate contamination issues.

We plan also to submit all of the Pilot BEST results to EHIB by the end of summer, continue to develop BPA substitute method, so that's like a BPS, BPF. We are right now still working on it. And complete instrumentation installation for identifying unknowns, and also, complete our work flow development with this new instrument when fitting in our old work flow, and learn from the other laboratory's experience to do the unknown identification.

Thank you.

CHAIRPERSON LUDERER: Thank you, Dr. She. Before we move on to Dr. Petreas, are there any quick clarifying

questions from the Panel? We'll have time for discussion after both presentations.

Dr. McKone.

PANEL MEMBER McKONE: I can get this.

Without getting into too much detail, when you compare the two studies between the NHANES and -- so several of the hydroxy-PAHs, the ratios were quite different. Is that due to -- I don't know enough about the biology or metabolism, but you would think that there wouldn't be such a strong difference between the relative partitioning among different metabolism, or is that quite normal?

I mean, what I'm asking is if you took a random subset of NHANES, would you see such differences in -- I'm thinking of the hydroxy naphthalene ratios were really different, among -- I mean there were other ones too. Does that make sense or is that unusual that might suggest there's a pregnancy or the population you selected or the type of source may lead to a different ratio of hydroxy-PAH?

DR. SHE: So the first thing when we see something like that, we need to eliminate laboratory error. That's for us to do, said okay this is pattern is true. When we confirm the pattern is true, we needed to know this chemical doesn't make sense, like you mentioned

does that reflect the different exposures or that suggested a different populations?

So for -- I think it should be okay for it to be different. And then now, for example, different -- we have the, I think, the low molecular naphthalene with 2 benzene rings, that's small molecular. The exposure source may be different than the high ones. For example, 3 benzene rings, 4 benzene rings, it's generally believed small molecular maybe inhalations you get more from the air, the bigger ones maybe from the diet.

So different population, different studies, like MIEEP. And then maybe people exposed more compare the NHANES general population inhalation for 2-naphthalene, but I cannot know why the 1-naphthalene is not so different, and they're also small molecular. So we need to further study this to see why like this.

PANEL MEMBER McKONE: Thanks. I don't want to -- I mean, it's not a prolonged discussion, but I think it's an interesting point to note that, you know, there should be some explanation, because, you know, I don't know. I'm assuming there's a lot of variation in metabolism pathways for different people. That might be what we're seeing.

DR. SHE: Agree.

CHAIRPERSON LUDERER: Dr. Wilson and then Dr. Fiehn.

PANEL MEMBER WILSON: Thank you, Chair. Thank you, Dr. She, for your presentation. Did you say that in light of the different study designs between MIEEP and NHANES, that it would be improper to make comparisons in the -- you know, between those two, or did you say that it's -- that we can make those comparisons, as long as we qualify the comparison or note the limitations?

DR. SHE: Personally, I believe we can make a comparison. But a comparison is not like -- for example, I think the phthalate results don't have a difference so much as the PAH result. So if we do, as I said, a study design, it can make it impossible to compare. I think that kind of limits ourselves, because the difference -- the two chemicals show different magnitude of difference.

And then within the same group for chemicals, like Dr. McKone just mentioned, you can see the different profiles. So the strictest statistical comparison is different than the chemist try to look for the source, so that -- so the -- so overall, I think we should be able to make comparisons with some constraint.

PANEL MEMBER WILSON: Thank you.

CHAIRPERSON LUDERER: Okay. Dr. Fiehn.

PANEL MEMBER FIEHN: Thank you, Chair.

I wonder in terms of the identification of unknowns how you select those unknowns? There are

thousands of unknowns in the human specimen. And the most important part is to select the unknowns that are of some relevance to potential harm. Do you select those?

DR. SHE: Yeah, that's a very good question. We sort of, for us to start, when we are around, that's from color dye. That's a Professor of Research, Derek Muir. He published in EST 600 PBT chemicals. We thought maybe other list, like European, have the same list. So chemicals already some were identified maybe have significance for the PBT, persistent bioaccumulative toxicities.

And we sort of maybe start with this 600 to go construct our database, to start it from there. So that's -- but we like to get input from the Panel and audience to suggest what was the best way to start this.

CHAIRPERSON LUDERER: Thank you, Dr. She.

We'd like to move on now to Dr. Petreas' talk, and then afterwards we'll have Panel discussion of both of the presentations.

Dr. Petreas.

(Thereupon an overhead presentation was presented as follows.)

DR. PETREAS: So good morning, everyone. So I'll give you an update of our Department of Toxic Substances Control laboratory, and I'll give you a status -- a little

bit about our staffing changes.

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DR. PETREAS: I'll move on to give you some results from progress from the different studies. I'll revisit the question that we discussed in the previous Panel in April about the feasibility of using the archived prenatal serum from the Genetic Disease Screening Program, which is one of the potential new populations that Dr. -- that Mr. Baltz raised about where do we find -- what's the next study. And also, other activities related to the Program.

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DR. PETREAS: So, first, I want to say a big thank you and farewell to Sara Encisco, who was with us for about a year, as part of the CDC grant. She moved now to Duke Medical School. She was really productive when she was there, so we'll miss here.

So overall, we have two originally funded positions, State funded from the original bill. Our four funded by CDC, now we have one vacancy, Sara's vacancy, and we're actively recruiting to fill that vacancy. And, of course, a lot of work is done by people like me who are not funded by anything of this. So there are a lot of in-kind support from other staff in our Department.

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DR. PETREAS: So one of the laboratory collaborations that Dr. DiBartolomeis mentioned, which is now under the biomonitoring umbrella, is the California Teachers Study. So a little summary about that.

This is a big cohort started in the nineties. So we're working with the Cancer Prevention Institute of California, UC Irvine, University of Southern California, and the City of Hope in a small substudy funded by the Breast Cancer Research Program to look at the chemicals as risk factors for breast cancer in these teachers.

Recruitment and sample collection is still going on and starting in 2011. And we may have to extend beyond 2013 in order to acquire the number of participants. The aim is to have about 1,000 cases and a 1,000 controls from the teachers cohort throughout the state.

In our lab, we're analyzing for PCBs, PBDEs, perfluorinated chemicals, and we're sending out for thyroid hormones and lipids. So far -- this is an ongoing recruitment. So far, the age of the people who they have recruited are from 44 to -- 45 to 94. So it's a rather older women's group.

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DR. PETREAS: Where we stand as of last month, we have received about 1,700 samples. And as I have said many times, different chemical classes are treated

differently, so multiple analysis in parallel.

So the bottom line is that as of last month, we have released to the principal investigator, and also posted on our website, data on perfluorinated compounds from over 150 women, and for PBDEs for over 500 women. And we're in the process of completing the analysis for the PCBs and pesticides, which again will be processed and released and posted on the website.

This is ongoing. So as we receive more samples, we'll batch them and put them into the analytical queue. So we're making good progress there.

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DR. PETREAS: Now, one of the specific aims of the study, as was funded, was to look at predictors of PBDEs in these teachers. So I'm going to show you preliminary data now.

Using blood from 481 women, these are the controls, no history of breast cancer. And these are oversampled to ensure racial and ethnic diversity. And if you look at the race breakdown, we have 45 percent are white, but about 20 percent are black, Hispanic and Asian and Pacific Islanders in the other groups. Again, it's an older group. Median should be around 65 there.

And using these data, Dr. Reynolds is heading a poster at the conference in Switzerland next week, where

we're presenting our preliminary but multivariate analysis. So after adjusting for everything we could, this is what we see.

I'll give you some highlights here. At this older age group, we don't see much relation between age and levels of PBDEs. So apparently, they reach a plateau at the time. Also, that what we have seen elsewhere, but now we can document it, the predictors for BDE-47 and 100 are very different from BDE-153, which is expected since the latter has a very long half-life. So it's different, I guess, metabolism there.

So from our multivariate analysis, we see that we find higher levels for BDE-47 and 100 in those women who are not white -- it's not the first time that I have seen that -- overweight and obese, and living in the second lowest quartile of socioeconomic status neighborhood.

Also, they live in homes with more carpeting and have flown in a plane in the last year. That's what comes out with multivariate analysis.

Interestingly, the higher levels of BDE-153 are in women who wash their hands more frequently. These are questions from the questionnaire, so we don't know what they represent exactly. One thought may be that because they wash their hands more frequently, they have less of the BDE-47 and 100, which is more related to dust, but we

don't know.

So this is again preliminary. And it's going to be presented next week. And I'm working on, as we acquire more data and working on the manuscript, we may have better explanations.

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DR. PETREAS: Okay. So an important question was, the Genetic Disease Screening Program is a statewide archive of prenatal serum samples. So we raised the possibility of collaborating with the Program to acquire data -- samples for getting almost statewide survey of prenatal samples.

The question from the laboratories, can we use it to measure these chemicals, given concern that the laboratory has, first of all, is it adequate volume for that?

The collection tube used by the Program is different from what we have experience with and seen, in terms of contamination and background. And also, could there be chemical contamination during the process for the Genetic Disease Screening Program analysis?

So what we did, staff visited the Genetic Disease Laboratory to observe how these samples are treated for the objective that they are collected and to look at biomarkers for these genetic diseases. So the thing we

didn't like is that the serum samples stay uncovered for several hours while being tested. And there are three different plungers that immerse sequentially into the samples.

And for the lab, this is a very, very -- you know, a concern, because we're very concerned about background and clean and everything. So nevertheless, we decided to test, and we exchanged samples. We provided three of our laboratory blanks, which are bovine serum without anything in them, and we sent them to the Genetic Disease Laboratory to treat them like any of the other samples. So they went through the auto sampler and the plungers, immersed and so forth.

At the same time, the Genetic Disease Lab gave us 20 samples from the program -- from the Screening Program, and this came from two separate clinical labs. So 10 and 10 from two different programs that happened to be in that lab that day. And we analyzed for PBDEs, PCBs, pesticides, and perfluorinated compounds, those 23 samples.

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DR. PETREAS: So what we found was quite encouraging, because the bovine blanks, only three, we had no background. The only thing that had a background was PFOS and hexachlorobenzene. But these backgrounds were

not significant, given what we expect the levels to be. So they wouldn't impede any measurement.

Now, we analyzed those 20 samples from the two clinical labs. And we thought of comparing with what we know from another -- the maternal serum collected in November 2010 and 11, similar time from the MIEEP.

Now, we did not analyze for lipids, because in this case we had limited volumes in some of the samples. So the results I'm going to show you, are in nanograms per milliliter and adjusted for lipids. So that's the usual thing you see.

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DR. PETREAS: But here is what I can show you. For PBDEs, again, on a wet weight basis, the light blue is the Genetic Disease Screening Program with the 20 samples. And you can see I'm showing you three BDEs here 47, 99, and 153. And consistently, the detection frequency is lower in our genetic disease samples than it was for MIEEP. A few years earlier collected in MIEEP, and also it's a different population. MIEEP was most -- I mean, we don't know where those 20 samples came from, but we know that the MIEEP was a more -- low socioeconomic status population from San Francisco.

But the encouraging thing is if you compare medians, levels of anything are lower in the Genetic

Disease Screening Program than the MIEEP. So the first concern about contamination is not there. So even -- so those samples did not raise a concern we had that something bad is happening. Was there more sample? Just one snapshot in time, but that's what we have.

Similarly, when we looked for DDE, PCB-153 and PFOS, again the detection frequency is less for DDE. And again, this was a lot of hispanic women who are in MIEEP.

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DR. PETREAS: So this may explain the DDE 100 percent detection frequency in the MIEEP as opposed to 50 in this smaller data set.

But if we look at the PFOS, the same -- the samples are very similar. So there's nothing artificial about these samples or how they were treated that the -- for the genetic disease screening. We don't see a big problem here.

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DR. PETREAS: So going back to the questions we had, can we use it? Do we have adequate volume?

Probably, but we're not sure, because some samples were very small. So this may be one of the criteria in selecting which samples to include, if we go ahead with this program, maybe as a requirement should be an adequate volume to allow to test for lipids as well,

because there was some concerns we discussed in April about could these samples have been desiccated by sitting outside in the -- outside of the refrigerator open.

And I think that doing the lipids analysis would see were they still within physiological levels. So we need to have, of course, adequate volume to do that.

As far as the different collection tube, we didn't see any effect of that. And as far as chemical contamination, again, small data set, but we didn't see any problems in the lab in the analysis of the serum samples.

So I think it's encouraging for us to pursue more and see if this is a viable program to -- for us to sustain the Biomonitoring Program.

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DR. PETREAS: Okay. I'll give you now -- highlight some FOX data for a presentation again at the same conference next week. I'll talk about our other laboratory collaboration on the Three Generations Study, and how this can provide the information in data for Biomonitoring California. And some other collaboration we have with UC Berkeley on the Northern California Childhood Leukemia Study, and progress we're making with flame retardants in dust, and our plans for identifying unknowns.

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DR. PETREAS: So first of all, a reminder about the FOX. These are 101 firefighters. They were contacted and samples were collected in 2010-11, and we had a questionnaire on demographics, work practices, and other activities. Blood and urine were collected.

So here we're using just the blood results for PCBs, PBDEs, and pesticides. And tried to compare our FOX data with the NHANES, only the males who are over 20 years old, knowing that NHANES was collected a few years back. And also, there was a small study that was recently published with 12 firefighters from San Francisco. So we felt we should compare what we found to these two populations.

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DR. PETREAS: And just in a graph here, geometric means, what you -- I mean the only thing to take home here is that DDE and PCB-153, our population is lower, the geometric mean unadjusted and everything, than the NHANES of several years back.

On the other hand, BDE-47 is higher. So BDE is something different that's happening with the firefighters with the BDEs, without adjusting anything so far.

So here comparing the BDEs, we thought of focusing on the PBDEs. And I'm showing again the major

ones 47, 99, and 153. In the different rows are the FOX data, the San Francisco firefighters, and the NHANES, again, older males.

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DR. PETREAS: And if you skim through, again, the distributions show that our firefighters are in the same ballpark maybe or higher than the San Francisco ones and clearly different than the NHANES. And that's true for medians and other percentiles that I'm not showing here.

So there's something different there in occupational groups. Like the San Francisco firefighters are in the same area or range of results.

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DR. PETREAS: The other thing which was very interesting, this is preliminary only by variate analysis at this point. And we found that PBDE levels are a function of age, where the younger firefighters are -- have higher levels than the older ones, and also with job title.

So firefighter and engineer have higher levels than the chief and captain. Again, this is just by variate here and obviously age and job title may be together combined. But this is common sense that indeed people who are on the frontline may be more exposed to PBDEs along with any other exposures they get than the

chiefs and captains.

And something interesting that Dr. Wilson raised, we're very, you know, excited because we do see significant differences and lower levels, not so much about the self-contained breathing apparatus used during clean-up and so forth. But what was really clear is if they stored the gear in ventilated or open areas, or if they cleared -- cleaned the gear outside, they had lower levels of PBDEs. And, of course, any other suit and other material that they may be tracking from the fires.

So this will be very nice once we, you know, confirm that, and to be relayed back to firefighters who participated, but also in general for occupational exposures.

So that will be presented. We'll still working on a manuscript to go into more detail, but we'll present this -- sorry, so we'll present that next week.

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DR. PETREAS: Okay. Another study, a collaboration of our lab with the Child Health and Development Studies. Barbara Cohn is the PI. This is an ongoing long cohort established in the late fifties, including 15,000 pregnancies at Kaiser Oakland. And there's archived perinatal serum and information on demographics and reproductive history and behavior on

smoking, alcohol, and so forth.

So the exciting thing is for the first time -- we have worked with Dr. Cohn on several of these studies of these mothers who were sampled back in the sixties. For the first time now, as part of the Three Generations Study, we'll be looking at the adult daughters who are at the age where they may be also experiencing or developing breast cancer.

So this is an important study, where we'll have 300 of the adult daughters. So the study is ongoing. So we have -- I'm showing here median age. There's a younger population than the teachers. Median is 50, if that's young. Forty-six to 54 is the range. And interestingly, 50 percent is black and the other half is white, Latina, and Asian, and some mixed.

So this is a population of samples that we have in our lab, and we are analyzing for pesticides, PCBs, PBDEs and hydroxy-BDEs. We have already completed the perfluorinated and returned to the PI. So again, as we did with the teachers study, we're bringing this study under the umbrella of Biomonitoring California. And we have the agreement that the aggregate results again will be shared and posted on our website, because they represent a different demographic of the state.

Now, we cannot post results until all the results

are returned, which is expected in the spring, because that study will do a follow up to see the participants' reactions. So they want to make sure nothing is leaked before they get the results, and have the testing of their evaluation.

But upon completion, the results will be posted. So again, this is how we expand our database.

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DR. PETREAS: And again, it's how we feel with synergy we can sustain the program.

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DR. PETREAS: A brief thing about the Childhood Leukemia Study. This was one of the proposals we got when we had the Request for Information back in 2012. So we're collaborating with UC Berkeley. Pat Buffler is the PI of the study. And we have developed a method to measure -- sorry -- PBDEs in very small volumes of whole blood. Usually, we do serum. It was whole blood from the children with leukemia.

We also have mother's serum of these children. And we have already done dust -- house dust from the same population. So sample analysis in progress and hopefully we can have more updates in a future meeting about any findings.

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DR. PETREAS: Flame retardants in dust. We expanded -- we have used the methodology on PBDEs and PCBs, PAHs, and new brominated flame retardants, and measured those chemicals in house dust from the leukemia study and some other pilot studies we do, and from the firehouses in the FOX study.

We are in the validating phase of a new method to measure the phosphorus flame retardants in dust, and we're making good progress on that. Yeah, and because we believe that the environmental measurements complement biomonitoring, and will help assess environmental exposure pathways.

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DR. PETREAS: So as we discussed in the previous time, many non-targeted analytes obviously may be important new candidates for biomonitoring and want to be able to have those. So, as Dr. She reported, there's a lot of new technology. And now we have machines that may be available.

And fortunately, the CDC has allowed us to purchase one of these with -- in our fifth year budget. One requirement the CDC has is that the instrument should be able to do, not only qualitative, but also quantitative analysis. So we're exploring vendors. So we have looked at specifications. We sent them blindly samples for them

to report back to us to see what they find. Price is an issue here, but our department is willing to chip in maybe to -- if, in case -- if we need to buy a very good expensive instrument beyond our budget, we hopefully can do it.

And as we speak today, we have -- our first vendor is giving a seminar in our lab for presenting their -- so I have a sequence of vendors coming trying to, you know, convince us to buy their equipment. But we are talking with many users, you know, so we want to really get something that's appropriate for the program.

And I think this is all I have.

CHAIRPERSON LUDERER: Thank you, Dr. Petreas.

Do we have any quick clarifying questions from Panel members for Dr. Petreas?

Dr. Cranor.

PANEL MEMBER CRANOR: A really quick clarifying question about the maternal -- the Barbara Cohn work that you're doing. I'd heard at one point that UC Berkeley had had these blood samples and they were going to be destroyed because they didn't have the money to keep them. Is this a different set of blood samples or the same set or --

DR. PETREAS: No, they're --

PANEL MEMBER CRANOR: And this is a very valuable

resource. I'm just curious about it.

DR. PETREAS: They're maternal samples. CHDS as we call them, sometime in Frederick, Maryland. So there's a repository there. The daughters, you're right, were stored at Dr. Holland's lab in Berkeley, but they're in our lab now, so they're not going to be destroyed.

PANEL MEMBER CRANOR: Just curious. Thanks.

CHAIRPERSON LUDERER: Okay. If we don't have any other clarifying questions, we have some time now for public comments and then we can have a short Panel discussion after that.

Do we have any comments that were submitted?

MS. DUNN: We don't have any comments.

CHAIRPERSON LUDERER: Okay. Thank you.

So then now we have a little bit of time for the panel to talk about both presentations.

Dr. Quintana.

PANEL MEMBER QUINTANA: Hi. This comment is for Dr. She over there.

I'm just going back to comparing the NHANES with the MIEEP data. Maybe I missed this, but I recall that in NHANES the pregnant women were sampled overall three trimesters. So they had representation of all three trimesters pretty equally in the ones I had looked at. And I'm just curious -- I think not enough is known about

changes in biomonitoring in the same women over her pregnancy. You know what happens to that marker as your blood volume doubles and other changes occur, you know.

And I'm just curious if the MIEEP data was equally distributed over the trimesters of pregnancy or if it was a certain visit that it was collected, and if that's been taken into account for interpretation. I just think it's very interesting the whole biology of pregnancy and biomonitoring could be explored further and more data is needed to really interpret these kind of results.

DR. SHE: A question like this goes beyond my knowledge. I think I will ask for some help. And Laura or someone you want to comment.

DR. WATSON: Berna Watson, Biomonitoring Program.

The blood samples are collected when the pregnant women come to -- for labor. And also, urinary -- urine samples too, or in a few cases urine samples collected after labor when they were still in the hospital.

DR. SHE: Anyone else want to add something about this trimester sample?

So I'm not sure there's a good answer to completely answer your question, but we need to get back to you more, if we get more information on it.

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: Just a related comment.

In our work, and I think in others, there can be changes in creatinine levels, for example, during pregnancy. So when you adjust for creatinine, it may mean something different if you're adjusting later in pregnancy or earlier in pregnancy. In some of our data presentations, we've actually chosen not to creatinine correct for pregnant women. There's -- I think the debate is still open on that.

I'm also -- I think maybe Tom mentioned that too. I'm just really struck by the difference in 1-naphthol and 2-naphthol levels, given I think that they -- well, in some cases, they can derive -- I think 1-naphthol and 2-naphthol often derive in equal amounts from certain parent compounds.

Also, 1 -- the ratio can be an indicator of exposure to certain pesticides, specifically carbaryl. So it might be interesting to look at that ratio and relationship, and the distribution. I suspect here that there's relatively little carbaryl exposure going on, but that would be a way to confirm that.

DR. SHE: Yeah, that's a very good comment about normalization by creatinine. We should learn more about that comparison with normalized data an unnormalized data.

And about the profile, 1-naphthalene and 2-naphthalene, like Dr. Petreas tried to do the predictor

of the certain PBDEs. We did a little bit of research one of the naphthalene, for example, 2-naphthalene we look for the extra source beyond possible common source for both of them. 2-naphthalene may come also from hair dyeing from whatever the -- whatever you call it.

So we did a little bit of research to try to explain that. And so that's a good comment, we need to further look at this.

CHAIRPERSON LUDERER: Dr. Fiehn.

PANEL MEMBER FIEHN: I would like to come back to this strategy of identifying unknowns. I think it's a very valuable idea to expand potential pollutants or hazardous chemicals. However, there must be a very clear cut strategy, and I would encourage both laboratories to think and collaborate on the strategies how to find those.

It's not the mass spectrometer that is the deciding moment. Neither is the -- nor is it the, you know, work flow for spectronification, but it's really the workup, you know, and the samples, and the decisions that are made to look for one specific peak or one specific compound, and not for others. You will never be able to identify thousands.

So the harm or the pitfall is really looking at the wrong piece. And there's many, many biases one can do to sample preparation, as you all know, I'm sure. And so

these are very important, in terms of polarity of compounds and so. One idea, of course, would be as you pointed out to say, well, we would have certain compound classes. We focus on unknowns that have chlorine or bromine atoms in them, because we -- they are easy to find -- comparatively easy to find.

However, we also know, of course, it's not just bromine and chlorine molecules, but many others that might have -- cause harm, like pesticides. So that is -- you know very careful decisions have to be made, and consciously made. Otherwise, you will just lose time.

DR. SHE: Yeah. And Dr. Petreas can comment later on that. I think this is very important suggestion -- good suggestion. Both laboratories work together, so this is -- identify unknowns is complex and they need a comprehensive approach. So the profile of work flow I show just reflects, at that time, what we have done. But definitely sample preparation, how you maintain -- make sure the sample preparation the chemical you're seeking is not already eliminated by a sample clean up procedure. So that's one issue.

And then regarding how we identify the classification, for example, we are thinking they are different class of chemicals. So we do agree we needed to look for -- start from something small, and maybe even

like something easier, as Dr. Fiehn mentioned, halogen compound. Halogen compound have a specific unique mass spec features. For example, mass defect.

So halogen element is not -- so that mass defection show you, okay, this may have halogens or bromine, chlorine and then profile of the M plus 2 peaks. And so we also think about work with ECI for long-term, like can we use the neutral losses allow us to find a certain group of chemicals, like a protein. I use a protein and an amino acid as examples. They may have specific neutral losses than the other group of chemicals. There are a lot of halogens.

And then go to ion scans to see, okay, these chemicals they may have creatinine. I use the example creatinines. They always have 85 peaks. So this kind of combination, comprehensive approach that we try to start with. But definitely, we need to learn more and be careful to not go to the wrong path.

Myrto, you want to?

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: I just wanted to follow up with a comment. I think Dr. Fiehn -- am I pronouncing it correctly?

PANEL MEMBER FIEHN: (Nods head.)

PANEL MEMBER BRADMAN: You know, I think your

contributions and thoughts about this will be really important for this Panel and going forward. There have been previous discussions about unknowns. And the concept and the idea of looking for them was kind of a -- was a high priority for the Panel, in terms of identifying things that might be important that we're not looking at. And also looking forward, different kinds of compounds might be coming onto the market we don't understand. And perhaps the Biomonitoring Program can be at the cutting edge in working with that.

And so I think the big picture is there's a lot of support for looking at unknowns. And I can see that the nitty-gritty is going to be very challenging.

And I think that, to the extent that the Panel can provide both specific technical advice and also perhaps general advice like, you know, maybe it makes sense actually to focus on the halogenated compounds, because of -- there's a general interest here has been on, for example, flame retardants, at least many of which are halogenated. That might be a place to start for practical reasons. But I think there's going to have to be a lot of thought about that, and I look forward to your contributions.

DR. SHE: Actually, I'd like, as Dr. Asa Bradman mentioned, I think your contribution in the metabolomics

will be very important for us to learn, and then especially you published many very high levels of how to do the quality control for the unknown identification, we start to learn. So all of this comprehensive approach with the Panel's input and our lab's self-learning, and I hope we can develop a good strategy to avoid the Program go to a wrong path.

CHAIRPERSON LUDERER: Dr. Alexeeff.

DIRECTOR ALEXEEFF: I actually have a question -- a comment on Dr. Petreas's presentation.

So I was looking -- my recollection is that in the NHANES that DDE levels were higher in the Hispanic population that had recently come or that had come originally from Mexico. And maybe we could checkup on that. And then -- because also in the MIEEP study, there's a large proportion of Latino women in that study.

So I'm just wondering that might be something to think about, and if you go further, in terms of this evaluation, to consider that issue.

DR. PETREAS: Yes. It's very preliminary, I mean what I was showing. It was only to see whether -- do we expect any bad news from the lab handling of these specimens. This is just exploratory to see if it's feasible to use this very valuable resource to -- for the Program.

So the only thing we thought superficially maybe is to compare with the MIEEP study with the caveats you mentioned. These were different groups of women. Of course, we don't know where those 20 came from or how representative those 20 are for all the perinatal samples that are in the -- but at least we didn't see any red flags saying, woops, you cannot use this. So that's the only message, I guess, we can -- we're not going to compare MIEEP with those 20. Its's not...

DIRECTOR ALEXEEFF: Right.

CHAIRPERSON LUDERER: Dr. Kavanaugh-Lynch.

PANEL MEMBER KAVANAUGH-LYNCH: I'll just let Dr. Wilson run it for me.

PANEL MEMBER WILSON: I finally got it, yeah.

(Laughter.)

PANEL MEMBER KAVANAUGH-LYNCH: I just wanted to make an observation and comment. So, clearly you've heard the name, the California Breast Cancer Research Program a couple of times this morning. And I wanted to say that the existence of the Biomonitoring Program and the capabilities it has developed has allowed us to pursue in an area of funding that we are very interested in, which is the role of chemicals in breast cancer. So the mere existence of the lab and the capabilities that the labs have developed has allowed us to fund work that I don't

think can be done anywhere else. And I'm very grateful for that.

And I think the Program also benefits that, at this time, when it's not fully funded that our funding of these projects continues to provide funds to keep the labs open and running and doing something, while we're waiting for someone to give us money.

So it's been a very mutually beneficial relationship that has, I think, allowed both programs to do some really cutting edge important work. And I think -- I believe the new San Francisco firefighters study is a new one that will be added to the list. So, yeah, there's some exciting stuff going on.

And we may be issuing an RFP sometime in the next six months to a year on looking at time of flight analyses, look at unknowns in drinking water. So that may be something that someone here might be interested in looking at.

CHAIRPERSON LUDERER: Dr. Quintana.

PANEL MEMBER QUINTANA: Hi. I just wanted to talk about potential ethical issues of the unknown analysis, because I think the unknowns is a very exciting analysis. It might bring up compounds we hadn't thought about that we should be looking at.

But a colleague of mine, Dr. Eunha Hoh developed

an untargeted method for looking at house dust for the National Children's Study their formative research. And when you look at composite samples, you see all kinds of interesting products, and she's about to publish this, but you also see lots of drugs of abuse and other compounds.

And so, I think, when you're doing untargeted analysis, we have to think carefully, because in this case, you are actually -- you have that data. You know, it's not like other samples where you might test for drugs, but you don't. In this case, you're going to see them and perhaps exclude them, but we should have a discussion about kind of the ethical implications for participants when you are looking at unknowns.

CHAIRPERSON LUDERER: Any other comments or discussion from Panel members?

Dr. Cranor and then Dr. Quint.

PANEL MEMBER CRANOR: I wanted to -- any open question, is that fair game?

CHAIRPERSON LUDERER: Yes.

PANEL MEMBER CRANOR: I wanted to return to the firefighter program, but ask a much more general question.

CHAIRPERSON LUDERER: Actually, I'm sorry. We're actually still trying to focus on the current presentation.

PANEL MEMBER CRANOR: That's fine. That's why I

asked.

CHAIRPERSON LUDERER: Okay. Dr. Quint.

PANEL MEMBER QUINT: Yeah, I just wanted to -- Julia Quint -- add to the concern -- the ethical concerns about unknowns, because in occupational health circles, I think, workers are very concerned about biomonitoring for that very reason, because it can raise issues, you know, with their employers. They're fearful, you know, that people will use monitoring against them. So I think when we do occupational studies, that's a particular concern, and talking about it is important how to deal with it.

CHAIRPERSON LUDERER: Any other questions, comments from Panel members?

I did have one question actually for Dr. Petreas. I mean, sort of a general comment and then a question. The general comment is, I think, it's -- you know, it's always impressive to see how much the Program is doing in terms of being able to collaborate with investigators, finding sources of samples, but then always keeping in the back of our minds that the ultimate goal was to perhaps to be able to do -- well, of the legislation, was to have a statewide representative sample, which Dr. Kavanaugh-Lynch and I think several others have mentioned.

And I know that the Program has not been funded to be able to do that. But one thing that I found very

exciting was the Genetic Disease Screening Program. I mean, there I think there's an opportunity to potentially do a statewide representative sample, at least of pregnant women, not of the general population, but it would nonetheless -- could potentially be used for that purpose, and I was wondering whether you could comment a little more on that.

DR. PETREAS: Well, I want to just focus -- you know, my role was to see other in-laboratory concerns. So I think we can say let's go ahead now and explore. There may be other parameters that the Program has to explore, and, you know, to see if this is a feasible alternative. But the obstacles we were concerned about, I don't think we should be concerned about. So we should explore now and hopefully it should work. It's a very good idea.

CHAIRPERSON LUDERER: Dr. Wilson, did you have a comment?

PANEL MEMBER WILSON: Yes. Thank you, Chair. I want to pick up on the sort of ethical question and also the point that Dr. Quint made about the implication of findings for workers, particularly in light of the proposed study of women firefighters in San Francisco.

There are more women firefighters in San Francisco than any other city in the U.S. It's a very active group of people. And thank you, Nancy, for

pointing that -- you know, this attention -- attention to the project.

And I think it's -- I think it's worth thinking through, as this project is getting off the ground, how the results will be interpreted and communicated, because I could imagine that one of the things that might emerge is that the profession of firefighting is potentially extraordinarily dangerous for women, and in identifying substances that are precursors to breast cancer, for example, on the pathways to breast cancer.

And that raises a whole set of very difficult questions for women in the fire service, and for the fire service, in general. And on the flip side of that, there are a lot of things that fire departments can be doing to better protect people, to better protect this workforce. And so I think my point is that as -- I guess, it probably ties back to my earlier comment about the results for the Orange County Fire Authority study, that we should, in communicating the results of the San Francisco women firefighters study, we need to pay attention and I think be as comprehensive as possible in articulating what are the things that can be done that are sort of short term, medium term, and longer term to protect people in this workforce and particularly women, so that the results aren't -- women firefighters, so that the results aren't

just sort of put out there -- with lacking that context.

CHAIRPERSON LUDERER: Okay. Thank you, Dr. Wilson. We're actually over time here, so I think we need to wrap up the discussion at this point.

We will -- I wanted to, before we break for lunch, ask Fran Kammerer, who's staff counsel for OEHHA, to give us a reminder about the Bagley-Keene Act.

Fran.

STAFF COUNSEL KAMMERER: Good afternoon. My purpose here is not only the Bagley-Keene Act, if you have any other legal questions, I'm here to answer them. If I don't know them immediately, I will find the answer and I'll get back to you in the follow meeting.

But for now, I'd like to remind you that when you break for lunch or any other breaks, to refrain from discussing the subject matter of this Panel, and bring that discussion to this place, so the public can participate in that discussion.

And that's about it.

Any questions?

CHAIRPERSON LUDERER: Thank you. Okay. So lunch -- we had planned to come back at 1:30, we'll continue to come back promptly at 1:30, please. So that gives us an hour and 10 minutes at this point. And, Laurel, did you have a --

DR. PLUMMER: Yeah, I just wanted to let the Panel members and the audience know there's a number of restaurants in the city center that you can check out. And there's -- I think there's also live music today.

(Laughter.)

DR. PLUMMER: So that's a nice perk.

Thank you, everyone. See you at 1:30.

(Off record: 12:19 PM)

(Thereupon a lunch break was taken.)

A F T E R N O O N S E S S I O N

(On record: 1:32 PM)

CHAIRPERSON LUDERER: Okay. It's after 1:30, so we need to get started again. So, Panel members, please take your seats.

All right. Thanks, everyone. I'd like to welcome everyone back from lunch, and I'm really excited to introduce the next session. So the purpose of this next session is to introduce the Scientific Guidance Panel to CalEnviroScreen, which is a new tool developed by OEHHA. And then the Panel will have the opportunity for discussion with the guest speakers and with the audience, discussions about both how CalEnviroScreen might be able to inform future biomonitoring studies, and also perhaps the potential role of biomonitoring in CalEnviroScreen and in assessing pollutant burden in different communities in California.

I want to just make a comment that after the presentations, there's going to be lots of time for Panel discussion with the guest speakers and for public comment, and then we'll have a brief wrap up of that session.

So I'd like to introduce the first speaker. The first speaker is Dr. John Faust, who is the chief of the Community Assessment and Research Section in the Office of Environmental Health Hazard Assessment. Dr. Faust has

managed the development of the California Communities Environmental Health Screening tool, which is called CalEnviroScreen, for short, as a way to consider the combined burden of environmental pollutants in decision making.

And this work has included evaluating scientific data on health and exposure disparities, population vulnerability, especially in low income or minority populations. And Dr. Faust has also provided technical expertise to the Office in the areas of toxicology, carcinogenic mode of action, dose response assessment, and risk assessment.

Dr. Faust.

(Thereupon an overhead presentation was presented as follows.)

DR. FAUST: All right. Thank you for the introduction. So what I'm going to do is talk about the CalEnviroScreen tool, the California Communities Environmental Health Screening Tool, and give you a bit of background about where the tool came from, sort of what the information is that it's comprised of, how we're providing results and then hopefully lead into the discussion towards the end about some of the mutual interests between our tool and then that of the interests and opportunities that might exist within the

Biomonitoring California Program.

So the CalEnviroScreen tool was developed by our office, OEHHA, in conjunction with CalEPA. And it's a product of several years of work that originally came from the CalEPA's Environmental Justice Action Plan. And essentially, it reflects a need to confront the reality that communities across California face burdens from multiple sources of pollution. And that there are populations that may be especially vulnerable to them. So decision making within the Agency should also reflect this reality.

So the tool is really a first step in identifying places across the State that bear higher burdens for multiple sources of pollution with populations that are vulnerable. And, as I said, I'm going to go over sort of how the tool is constructed and the information that's in it.

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DR. FAUST: So the tool itself was finalized as 1.0 in April of this year. So a screening tool itself is a way of looking broadly across the state at relative burdens from environmental pollution from multiple sources. Our particular tool is comprised of 18 indicators of environmental health and socioeconomic conditions across the state. And it uses a suite of

indicators that are combined together to come up with a CalEnviroScreen score that looks at these multiple burdens.

So the report itself, and there's a display copy that's available, and I think a copy was provided to each of the members, which also includes information on how CalEPA intends to use the tool.

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DR. FAUST: So, as I said, the program itself has origins in environmental justice. State law in California in 1999 defined environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.

But a second law from the year 2000 made specific requirements to CalEPA. And those included the development of an environmental justice strategy. And it further required each of the Boards and Departments within the agency to identify and address program obstacles impeding the progress of environmental justice.

So through a public process using a stakeholder workgroup, this idea of cumulative impacts that places, communities, people face burdens for multiple sources of pollution, was identified as a priority. And in the

Environmental Justice Action Plan, OEHHA was identified as the lead in developing guidance in this area.

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DR. FAUST: So this slide basically outlines some of the extensive public process that we had in moving this to the release of the CalEnviroScreen 1.0 in April of this year. We had an external stakeholder advisory group that we used over a series of multiple meetings to help guide the development of both our original framework, which we published in 2010 called Cumulative Impacts, Building a Scientific Foundation, and also through the development of the screening methodology, which was originally proposed in 2010, but which since then we've used an ongoing public process to help guide that as well.

We had a number of workshops that were conducted throughout the State, largely focusing on disadvantaged communities where we received a lot of input, and, as the slide says, we received over a thousand comments through that process.

And this all helped us to develop the tool further through a draft that was released in January, and then the final product, which came out in April of this year.

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DR. FAUST: So our guide through this was a

definition of cumulative impacts that was adopted by Cal/EPA in 2004. And I've included the long definition on this slide. And that is we think about the folks of CalEnviroScreen as being exposures, public health, and environmental effects from combined emissions and discharges in a geographic area, including environmental pollution from all sources, through all media, routine and -- or accidentally or otherwise released, but then we also need to take into account population sensitivity and socioeconomic factors where data are available.

So, as I said, we developed a screening method from this. And as the definition refers to a geographic area, we had to choose a scale of analysis. And for this particular program, we used the zip code scale. There were a number of different reasons for that. One of which is the zip code scale is relatively familiar to people. People know the zip code that they live in. There are about 1,800 zip codes across the state, so it represents a relatively fine level of analysis.

The boundaries, the census zip codes that we used for the analysis are fixed and defined. And we felt that it represented a scale that wasn't so large that you lost information due to averaging, but it wasn't so small that you lost information because you simply couldn't say something about a very small area. So that was our first

effort.

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DR. FAUST: This map, which is a little bleached out, but shows the coverage of the State. The green areas on the map are the zip code areas. They represent about 68 percent coverage of the State, and don't include certain unpopulated or very sparsely populated areas, like national forests and parks and so forth.

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DR. FAUST: So this slide shows the 18 indicators that we settled on for the analysis. They're roughly drawn into two categories or two broad categories that we described as pollution burden and population characteristics.

The ones on the left, pollution burden, include both exposures. So these are measures where we think people may be coming in contact with pollutants. And then environmental effects, and these are conditions where there is potential exposure, threat of exposure, or they represent conditions of environmental degradation.

So the indicators in this -- these two categories include certain measures of air quality, ozone, and PM concentrations, emissions of diesel particulate matter, pesticide use, traffic, and toxic releases from facilities.

And then for the environmental effects, these include certain sites or facilities such as clean-ups, groundwater threats from leaking underground fuel tanks, impaired water bodies, and then solid and hazardous waste facilities across the state.

On the other side of the slide are the population characteristics. And we've broken these down into, what we call, sensitive populations, which are sort of intrinsic characteristics of people that might suggest a vulnerability, and then additionally socioeconomic factors. And many of these factors are derived from census data, but we do include a couple of measures of health outcome, including asthma emergency department visits and low birth weight.

So just one point is that in this screening tool, we're not developing new information, but we're relying on information that's already available at some level. And many of our data sources come from the other Boards and Departments within the Agency, as well as from the Department of Public Health, and, of course, the Census Bureau. So what our tool does is bring together all these pieces of information into a single place.

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DR. FAUST: So this slide includes our criteria for indicator selection. So for each of the indicators,

we wanted each of them to provide a good measure of the -- or measure of contribution to the component that it represents. In our particular case, we wanted pollution burden indicators to reflect factors that, or issues, that would be potentially actionable by the CalEPA, since the primary use of this tool is to support decision making within the Agency.

Population characteristics indicators were related to factors that could potentially influence vulnerability to disease from pollution exposures. And then we also had certain criteria that we wanted information to be publicly available. And naturally, we wanted it to be of good quality as well, available across the state and current and accurate.

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DR. FAUST: So each of the individual indicators is scored independently. And an important point to make is that we're using a relative scoring system for each of the indicators. So each indicator is scored for each zip code, each of the 1,800 zip codes, across the entire state. And our calculation was a percentile calculation.

So, for example, if ozone for a particular zip code was given a percentile of 95, that meant that that particular zip code was worse or higher ozone concentrations than 95 percent of the other zip codes

across the state. And this slide just shows a distribution.

So then the next thing we had to do was to combine the information to reflect our interests in a combined score. So this shows the model that we used to combine the information. So essentially, each of the pollution burden and population characteristic categories are combined into zero to 10 score. And based upon a hazard times vulnerability function, the overall CalEnviroScreen score was up to 100, if either of those were a 10, but we didn't actually see that. So 10 times 10 is up to 100.

And, oh, I did want to mention, for the environmental effects we used half weighting. So the overall score for the pollution burden is a weighted average of the individual indicators within that category, but we did do half weighting with the idea in mind that environmental effects indicators were somewhat more upstream from the direct exposures that one would see with the air pollution and other toxicants that are directly released into the environment.

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DR. FAUST: So I thought I'd just go through a couple of specific examples of individual indicators. So here, on this slide, the indicator shown is for diesel

particulate matter. And, in this case, we relied on the diesel emissions inventory from the California Air Resources Board. They provided us information on diesel emissions as a four by four kilometer grid across the state that we re-allocated to the zip code scale.

And I don't know if you can see very well, but the distribution across the state is somewhat what one would expect with major transportation corridors where there's high truck traffic showing high levels. Also, in the areas of the ports and rail yards across the state, the Port of Long Beach and Los Angeles very darkly colored in the map in the lower part of the screen, as well as the Port of Oakland.

We've also noticed high levels in the distribution facilities, such as in the Inland Valley of the greater Los Angeles area as well. So that's diesel particulate matter.

Another indicator we used was pesticide use. And here, we relied on information from the Department of Pesticide Regulations Pesticide Use Reporting database. So here we did, rather than using all pesticide, we used a screen of certain pesticides, which were considered toxic or toxic and volatile. So we used information on the volatility of the chemical to screen out pesticides that exposures were considered to be less likely. And

similarly, we focused on those that were more toxic.

This particular measure only includes pesticides that are used in production agriculture. The non-production agriculture used pesticides are not available at the scale that we would like. We only have those at county scales. So given the uncertainty of how we would be representing that on a statewide distribution, we excluded those from this analysis.

So you see much what you'd expect with high pesticide use occurring in the Central Valley areas, the primary agricultural areas of the state, as well as certain other areas, like the Salinas Valley and other areas.

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DR. FAUST: So a third example. These are toxic releases from facilities. And so these -- this information comes from the U.S. EPA's toxic release inventory database. So these are facilities that report emissions of specific chemicals to the U.S. EPA's database.

Here, we used toxicity weighted pounds. The U.S. EPA provides us with information on pounds of chemicals that are scaled according to relative toxicity. So here we have a way of getting at higher levels for places that are emitting chemicals that are more toxic. We included

only on-site releases to air and water. And the map shows, I don't know, the distribution across the state with, you know, probably a heavy focus on areas that are industrial, where there are emissions, but that's the pattern you see here.

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DR. FAUST: So one of the indicators for population characteristics, here I include our measure of poverty. And in this particular case, we used the percent of -- the percentage of the population living at below twice the poverty level -- federal poverty level. And again, we redistributed the findings across the state. And the more impoverished parts of the state are shown in the darker colors on the slide with, for example, parts of the East Bay in the San Francisco Bay Area, and parts of central and south central Los Angeles showing up here.

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DR. FAUST: So what I'd like to do now is show you some of the combined information that we've made available. So these are the results when you combine both the indicators for the pollution burden and the population characteristics together using the model that I described earlier.

And what I'm hoping to do is a demonstration of the on-line results, if it works. So I'm going to review

shortly all the ways that we're making the information available, but this is an on-line mapping tool, where you can access all of the results across the state.

So, as I said, we have a combined CalEnviroScreen score, which, in theory, goes up to 100. So what we did was we calculated that score for each of the zip codes across the entire state and then sorted those by rank. And then here we've identified what are both the top five percent of those places. So, in this case, it's about -- about 80 zip codes or so that are in the top five percent, and then another 80 for the six to 10 percent.

So this link is available from our website. But just to orient you to the map. So the areas that are highlighted in the blue are the highest scoring CalEnviroScreen scores across the state. Those that are in orange are in the next tier, in the six to 10 percent range.

The tool is, I think, a pretty familiar mapping interface that allows you to zoom and pan around the state in different areas, and you can get quite close to different parts of the state.

There also are different printing options for creating PDFs of specific areas, if you're interested in that. You can change the base map here. I think we have a topographic base map, but you can look at it in

different ways still seeing the overlay of the high scores. You can -- there's a tool for measuring distance, and then there's also ways to share information, either by email or through various social media, like Facebook.

So it also has a search engine that allows you to zoom into particular places. So here I'll just hopefully type of some sort. In Oakland, we'll take a look at this particular area.

So this is Oakland. This is where we are. So you'll see that one area of Oakland was identified in our top 10 percent, and that's west Oakland, which is this polygon here. So what we've done is made information available through a pop up, so that you can click on anywhere within the area, and the zip code of interest will be highlighted in blue.

And then there's some basic information. The zip code number is at the very top, the total population included within the zip code is below, and then what we're calling the CalEnviroScreen group, which is it's -- you know, top five percent, five to 10 percent, and so on down the line. SO this in the second group of the six to 10 percent.

So in this pop-up as well, we have information that shows the percentile for each of the individual indicators. So, for example, in this West Oakland area,

the ozone measures in the zero percentile mean it's in the lowest group. PM 33 percent, meaning it's in the bottom third for lowest PM concentrations, and so on.

Diesel PM very high associated with the truck and port traffic that's there, and so on. Traffic very high, because of the Bay Bridge corridor. And then West Oakland has a number of clean-up, Superfund sites that contribute to high scores for groundwater threats, as well as clean-up sites and so on.

So you can also scroll further down, look at some of our measures of population characteristics, such as age, the asthma emergency department visits, which are very high in this zip code, low birth weight, educational attainment, linguistic isolation, poverty and race ethnicity, all of which are very high.

So the pollution burden score is put on a 1 to 10 scale, as the weighted average of the pollution burden indicators. And then the population characteristic scores are represented there as well, and then the combined score. So through this map, you can access all of that information.

So then, let's see, just as another example, we could look at Fresno, and then here you can do the pop-up and see how the different indicators measure up for this different place. So here, for example, pesticide use is

considerably higher, yet these are both very high scoring communities overall. So here you can see each of those measures.

So we do think it's important when you look at, you know, the individual places that you begin to see, you know, the patterns of the contributions to impact from these different sources. So we think of this as sort of a first way to get an impression of what sort of factors are going on in the individual zip codes across the state.

So a second tool, the mapping tool that we've made available, shows all the scores across the state, not just the top five and 10 percent. So again, here these are the same results that you would have seen with the five and 10 percent, but the gradation across the entire state for all the combined scores are available as well.

All right. There we go.

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DR. FAUST: Okay. So just to tell you the results that we've made available. We do have the CalEnviroScreen report itself, which, as I said, I think you have copies of and there's a copy available. So in this report, we identify each of the individual indicators. We say where we get the data from. We describe the rationale for its inclusion as a contributor to impact, and then we describe the methodology where we

access the information and how we analyzed it to make it available through the CalEnviroScreen score, and then there's a, you know, overall description of how the methodology is done and its rationale.

So in addition to the mapping interface we've also made all of the zip code information available at -- in an Excel spreadsheet, so you can see both the raw and the percentile scores for every zip code, and see the group scores as well, and how they fallout relative to each other.

Another interface we've made available is a Google Earth file, which allows you to sort of pan and zoom around the state and another way. And then we've also released them through an ArcGIS database for anybody who's interested in doing tore more sophisticated sorts of analyses that might require that.

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DR. FAUST: So just turning briefly to some of the potential uses within CalEPA. We think of the tool primarily as a way to allocate resources, that is to bring attention of CalEPA to places that we consider impacted. And some of those are listed on this slide, and these include informing decision making in the Environmental Justice Small Grant Program, prioritizing site clean-up activities and promoting greater compliance with

environmental laws in different places across the state. Another key application of this tool is in the allocation of funds from the Greenhouse Gas Reduction Fund, the Cap-and-Trade Program, which requires that certain fractions of funds go to communities that are identified as disadvantaged using various environmental socioeconomic and health criteria.

I do want to mention an important caveat, that is that this isn't a health risk assessment. The results aren't a predictor of human health risk, but that it is a tool that allows you to take a first look at different places across the state and see what may be contributors to health concerns from environmental pollutants.

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DR. FAUST: So I also want to mention some ongoing work that we're doing now. So as I said, the results here are presented at the zip code scale, so there are about 1,800 zip codes across the state. We're currently very actively working on developing the same measures, but at the census tract scale. So there are about 8,000 census tracts across the state, so this represents about, you know, a three-fold change in resolution. So you should be able to see a bit more finely where these impacts are occurring.

And one of the other areas that we're working on

a zone on drinking water quality measure. It's a very challenging data set to work with. The data don't all exist within one place, but that's something that we know is an issue across the state, and that is something that is important for us to develop. So we're very busily working on that as well.

So something else that we're sort of keeping in mind is, you know, environmental justice sort of is about, you know, this idea what we're going to be moving in the right direction. So as we develop this tool, we're thinking about ways that the data can be used to examine trends and improvements in environmental conditions over time. We know that it's a relative scaling now, so it's probably important that we think about how the raw data can be used and evaluated over time.

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DR. FAUST: So I just wanted to provide a little bit of a transition to a discussion about sort of some of the opportunities within the biomonitoring arena, and some of the common interests that we have with our CalEnviroScreen. And just to start that discussion a bit, I put up the -- sort of the classic health risk model. So this includes, you know, sources or uses of potential contaminants, pollutants and then they're distributed in the environment to result in concentrations through fate

and transport processes. And then human activities, and the presence of those, results in exposures, and uptake, and then dose, and then by interaction leading to health effects.

So the information that we have in our model is largely at the top. You know, we talk a lot about sources and uses. We include emissions inventories, use databases, the location of clean-up sites, and so forth. So a lot of what we have is around source and use.

We have a little bit that talks about environmental concentration, such as environmental air quality, and then as I mentioned, we're working on drinking water quality.

And then when it comes to examining vulnerability and sensitivity, we have certain demographic or socioeconomic measures that help guide that. And sort of the place that I see biomonitoring is down here. It moves us a bit closer. You know, and while I don't think of biomonitoring data as providing, you know, a statewide measure that we can, you know, replace all of this information with, I think there are some common areas, and those include that, you know, biomonitoring is also interested in the multiplicity of chemicals that people are exposed to. And biomonitoring data also provide information about differences among subpopulations and

differences by place as well.

So I think these are interesting areas that are going to be followed up in the next presentation.

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DR. FAUST: So here's information that just tells you how to get at the different databases and the reports that we've made available. We have an email contact that you can use.

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DR. FAUST: And I also want to acknowledge the great team that we have that have worked on this within OEHHA Laura August, who's our key primary analyst, and then of course George who's been out there supporting our program, as well as all the other people who have worked on different indicators over time. And we've also had good support within CalEPA.

And I do want to thank also our stakeholder work group, the other Boards and Departments within CalEPA, and Department of Public Health who provided information. We also owe a lot to consultants at UC Davis, Tara Zagofsky, who helped guide our public process. Dr. Rachel Morello-Frosch who has been a consultant on this for a number of years. And then academic experts as well, who've provided us with useful feedback over time. So at this point, I would be open to any questions people have

that I can try and answer.

CHAIRPERSON LUDERER: Thank you very much. That was a very interesting presentation. And do any of the Panel members have questions for Dr. Faust? We have time for questions now, and then we'll have a longer discussion afterwards.

Dr. Quintana.

PANEL MEMBER QUINTANA: First of all, let me say that's a really excellent and wonderful product. And any comments I'm making are not criticism, so much as maybe suggestions for further refinement, because I think it's really great.

The question I have actually came from a community member. So when I got the email about this EnviroScreen, I forwarded it to the different community groups that I work with. And one community was outraged to find that they weren't in the top 10 percent, as they thought they should be. This is a community that is where Highway 5 runs into Mexico and the San Ysidro, which is right across from Tijuana and it's home to the busiest border crossing in the world.

And so there's some unusual sources that perhaps aren't reflected, such as all the lines of idling vehicles waiting to cross the border, which aren't currently mapped under the different databases that you're using. So --

and they felt like the community next -- on the beach right next to them was in the top 10 percent, Imperial Beach, because of the impaired water quality and the groundwater intrusion that helped -- had an effect on that.

And so they said, you know, in the future is there any mechanism that the communities might request. Oh, we didn't think you've considered something, you know, or some kind of way they can interact with you to come up with questions like that.

DR. FAUST: Okay. Yeah. Well, we're very receptive to hearing information about conditions that exist in different communities across the state. That was kind of part of the purpose of our series of workshops through the last year was actually to go to these places and hear directly, so that is a useful piece of information.

I guess that said, I mean, I suspect that, you know, the traffic indicator, for example, and probably diesel as well, probably do score quite highly.

PANEL MEMBER QUINTANA: They have high -- they have freeways going through their community, but they have additional sources that aren't measured, because they're on the border.

DR. FAUST: Yeah. Just generally speaking, our

tool is comprised of individual indicators that sort of are of broad interest, I mean, are of concern across the state. And sometimes I think conditions that are unique to specific places can potentially not come out in the -- unless they're sort of a signal of other things going on that we are measuring.

But we're very interested in hearing, I don't know, sort of where individual measures don't seem to match up with what people know on the ground about conditions that exist within a specific place. And that would -- I think will help us to make the tool better over time.

PANEL MEMBER QUINTANA: And the other question they had was do you consider sources -- I didn't see that you consider if people drink groundwater as part of the groundwater score? Because in San Diego people don't drink groundwater however polluted it is. We're drinking all the polluted Colorado River water.

So, you know, should there be differential weighting for communities in the Central Valley living in wells -- using wells versus people who use piped in water from somewhere else --

DR. FAUST: That's a great question.

PANEL MEMBER QUINTANA: -- in terms of that groundwater contamination variable?

DR. FAUST: Yeah, we -- currently, the -- what we're calling groundwater threats, the contributors there are leaking underground fuel tanks, so we're thinking those more of as a condition of environmental degradation, not with the assumption that people are necessarily drinking the water.

The issue of who is drinking water that may be coming from the ground and may have contamination is one that we're trying to think about when we're doing our drinking water quality measure. And it is an important one, and we do need to know sort of who will be relying on that sort of water, rather than the major water purveyors. So that's a good point.

CHAIRPERSON LUDERER: Dr. Quint.

PANEL MEMBER QUINT: Julia Quint. I had two different questions -- again, congratulations. I think it's just an amazing tool. I had a question related to the TRI releases. I know that TRI doesn't include certain SIC codes, like smaller service industries, like maybe auto body refinishing and dry-cleaning maybe. So I'm wondering if that's picked up through a CARB? I know CARB monitors as well, and whether or not those data are integrated into the screen.

DR. FAUST: Currently, that information is not included. The Toxic Release Inventory does have a

reporting threshold, so that facilities that release chemicals below certain levels are not included.

ARB does have an emissions inventory, but we did not use that one out of concerns for consistency in reporting across the entire state. And because we're doing a relative scaling, we went for the time being with the toxic release inventory data.

PANEL MEMBER QUINT: And I think those chemicals are limited to a certain subset of chemicals that are on EPCRA.

DR. FAUST: Yes.

PANEL MEMBER QUINT: Right. So some of the emerging chemicals wouldn't be on there as well.

DR. FAUST: No.

PANEL MEMBER QUINT: And the other question I had is about people who work and live in the same community, because I know for a number of workers, they live in areas that are -- probably would rate high on a number of those areas on the screen. And is there any way to account for that in terms of, you know, a factor, forget which -- where it would fall, but --

DR. FAUST: No, that is an important point. Yes, mobility isn't really accounted for in the current model. And we know that, you know, people spend a lot of time in places not necessarily where they live. And there are

also, you know, sometimes transient populations across the state.

You know, the way our current model is structured, we're essentially describing the conditions that exist in a place, you know, and then we're also describing the population. So it doesn't particularly get at that intersection of, you know, people who don't necessarily live in the place that may be highly burdened. I don't know quite how to move in that direction, but if you have ideas.

PANEL MEMBER QUINT: Right. And I guess I was thinking of it from another angle, and that isn't the point of -- you're more community based. I was thinking about double burden of workers who work at the port and who live near, you know, because they're exposed both from what is generated from that site, you know, what's happening at the port, like the diesel, as well as going home and then, you know, on weekends or whatever being exposed as well, so -- or in different West Oakland or places like that, so -- but I don't know if there's anyway to get at that, unfortunately.

DR. FAUST: Yeah. Thanks. That's a good comment.

CHAIRPERSON LUDERER: Dr. Cranor.

PANEL MEMBER CRANOR: Thank you, John. Excellent

report. It does raise an issue that struck me earlier from some of the things the Biomonitoring Program does, and this might be an appropriate place to put the two together. You have largely identified sources of contamination and vulnerable populations, but sources of contamination that people are not contributing, that the individuals that experience them are not contributing to.

They also probably can't do a lot about them. Yet, there is a section in the report in the Biomonitoring Program, what can I do to reduce my exposures? And I don't -- I just want to call this to the attention of the Program, because I think that suggests that maybe individuals can do more than they sometimes can to avoid toxic exposures, which your report shows. There are a lot of involuntary exposures out there, and there's not much you can do about them.

And it might be useful in the section on -- the firefighters can do some things to avoid toxic pollutants. Ordinary citizens may be able to do fewer things, but you don't want to convey that -- I mean, you want to convey to people they can do something to give them a sense of empowerment, but there's not a lot they can do to give -- and that will give them a motivation to say, well, we need to clean up the neighborhood or we need to clean up the environment around us. So there's this fine line

between, well, what can I do to help myself and the other is nothing.

(Laughter.)

PANEL MEMBER CRANOR: And that needs to be there as part of, I think, the section on the Biomonitoring Program. Sometimes there's not much you can do, as this report shows. That doesn't call for a response. It's an excellent job.

Thank you.

(Laughter.)

CHAIRPERSON LUDERER: Dr. Fiehn.

PANEL MEMBER FIEHN: Yeah. I wondered about the 2.0 version, I guess. So how the model will develop, in terms of weights among different entities within the different contributors to post exposure as well as incidents, but also how it will develop to integrate other types of maps and like disease incidences. So say cancer risk and so on. So because there's lot more public information, and, of course, you have to select some and not others. You can't do everything. But obviously, it's a little light on that aspect. And so you say, well, we'll never be a really health risk assessment tool because, you know, that's too big, but, you know, you had asthma in it.

So you selected some and not others. And the

rationale is not always clear, I guess. So the question is how -- what other atlases, maps, databases will be integrated in the 2.0 version?

DR. FAUST: Well, that's -- that is a good question, and I don't -- I don't know that I have a particularly satisfying answer, but that as we move forward we will certainly be using a -- you know, a public process to take input on the directions that the tool should go and what types of information that should be included.

I think there are some very interesting questions that can be asked looking at relationships between the information that we have made available so far and other things like health outcomes.

The health measures that we focused on sort of were expressions of vulnerability and that we're thinking of, you know, high rates of asthma as being a population that might be sensitive to the effects of air pollutants in particular. So we are thinking about health as a vulnerability. In our original model, we did include, for example, cancer mortality, but sort of in this interest of moving towards vulnerability, we removed that as an indicator.

But, you know, moving forward I think we're very interested in statewide reliable, fairly geographically

refined measures of health. And we would like to look at them and consider how they could be integrated into the model or at least overlaid.

PANEL MEMBER FIEHN: Is there a feedback tool where people can make these kinds of suggestions?

DR. FAUST: Well, we have the email CalEnviroScreen@oehha.ca.gov where anyone can submit. And, of course, you can contact me directly with any ideas. And as I said, we do generally have our processes, they're all public. So we have those opportunities to submit information, comments, feedback in writing as well.

CHAIRPERSON LUDERER: Dr. Alexeeff.

DIRECTOR ALEXEEFF: You just want a couple more things for John here. So in terms of the tool, there -- a number of issues have been suggested that we're considering. For example, the type of employment, which gets to what Dr. Quint was talking about. There might be dense data we can get from the Census Bureau that talks about different types of employment where there were likely greater exposure because they're at a lower socioeconomic status, or the issue of unemployment and how that could influence people's responses to toxic substances.

And then in terms of the -- so there are some census things we're going to look at to see if it makes

sense to add them or not. And number of things have been suggested. The other one had to do with the as -- well, when -- Dr. McKone was on our academic panel, and as part of that academic panel, they had us revise our model -- or they suggested we revise our model, and change how we thought about some of these health indicators, which is what we did.

And what John was referring to, we changed the health indicators from simply just incidents of health problems to identification of vulnerable populations. So we are trying to rethink which type of health indicators the State collects, which we can think of as vulnerable populations. We think low birth weight not necessarily as an adverse effect, but those individuals with low birth weight are more sensitive to toxic substances.

So the other one that we're working on that could be in 2.0 that we -- is heart disease -- really the heart disease, because incidents of heart -- either heart attacks -- I can't remember the exact indicator, John. Do you remember which -- but we have, you know, those can make you more susceptible to the next one. And reporting cancer is one that we looked at, but we didn't see necessarily the logic of cancer increasing your susceptibility -- you know, your responsiveness to pollution.

But, you know, we're open to any kind of thoughts like that. That's the kind of thing we're thinking about in terms of that structure. Oh, and then also, the other thing was what Dr. Quint was referring to about auto body shops and things like that. We are talk -- working with a number of local organizations, whether it's the Bay Area Air Quality Management District, and -- we're still reaching out to some other organizations to -- who have looked at their communities and tried to, you know, map issues with regards to their community for regional planning, and trying to see what things we might be able to pick up on a statewide basis to add into a more look -- a smaller sort of issue that's prevalent throughout like maybe auto body shops or something like that. So we're looking at that as another possibility.

Oh, finally, the last thing was, is life expectancy. That's another issue that we're looking at as well, looking at life expectancy. The Endowment -- the California Endowment has done some studies on that, so we're looking at how we can look at it statewide.

CHAIRPERSON LUDERER: Thank you very much. We need to move onto the second presentation, but there will be time for more discussion afterwards. So thank you very much, Dr. Faust.

And now it gives me great pleasure to introduce

our next speaker, Dr. Gina Solomon, who was appointed by Governor Brown in April 2012 to serve as the Deputy Secretary for Science and Health a the California Environmental Protection Agency. And prior to joining CalEPA, Gina was a Senior Scientist at the Natural Resources Defense Council. And she has also been on the faculty of the Division of Occupational Environmental Medicine at UCSF since 1997. And she has served on numerous scientific committees for the State of California, including this Panel, the Scientific Guidance Panel for Biomonitoring California from 2007 to 2012.

So welcome back, Gina.

(Thereupon an overhead presentation was presented as follows.)

CAL/EPA DEPUTY DIRECTOR SOLOMON: Thank you very much. And it's a pleasure to be back here. And one of the saddest things I had to do when I moved into State service was resign from this Panel. It's a really excellent group, and fun to really be able to help develop this Biomonitoring Program, which I really think is a model for the nation, if not the world. So I'm very -- well, okay. It's big, but I think it is. Okay.

And also, I just wanted to welcome the new Panel members and thanks for joining.

And so my charge is to think about how the

Biomonitoring Program and the CalEnviroScreen may interrelate, and how, you know -- and sort of kick-off a discussion of the Panel about possible, you know, things we might want to do together or the way we might want to think about moving forward on biomonitoring with this information in mind.

The CalEnviroScreen really is a flagship project for CalEPA. It's something that's extremely high priority for the agency as a whole. So I did want to emphasize that, and talk about how, you know, all the OEHHA staff and CalEPA staff that have been involved in the project have been running around giving a lot of presentations to a lot of agencies, and, you know, trying to get agencies, for example, that have money to grant to start thinking about how they direct those funds, and to get agencies that have enforcement authority thinking together collaboratively across media about how to, you know, focus that authority and those efforts on communities that really need that attention.

So there are a lot of policy implications and activities underway, but there also is a whole scientific conversation to be had around the -- you know, the strengths and weaknesses of what we have and how we might build on it and improve it, because both the -- you know, the Biomonitoring California Program and the

CalEnviroScreen are very much living programs that are changing and growing and developing.

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CAL/EPA DEPUTY DIRECTOR SOLOMON: And yet they -- you know, they have some complementary characteristics. CalEnviroScreen looks at community level data. Biomonitoring California looks at individual level data, though we have the ability to, in both cases, look at that information over time, over space, by community or cut it in all different kinds of ways.

The CalEnviroScreen primarily is geographically based, and that actually can be an issue as you -- several of you pointed out in the questions and the discussion, that, you know, in the biomonitoring data set, we're seeing things that -- some things that may be geographically based in your community. You may not be able to do much about them. And then other things that may have to do with nutritional choices, personal care products, home furnishings, all kinds of things, that, you know, some of which you -- you know, some of which may be influenced in other ways than geography, and therefore not mappable.

And we also, so far, sadly in Biomonitoring California, have not really been able to do the statewide coverage that we originally might have hoped for, so we

instead have a series of regional projects all around the state. And that means that we get snapshots in different areas, but not the same sort of statewide look that we get in the EnviroScreen.

Then obviously, as John emphasized, that the EnviroScreen is a screening tool. It's, you know, just for priority setting, and, you know, a general look at, you know, sort of comparing communities, but it doesn't really get into the depths of exposure assessment, which biomonitoring can.

And the Biomonitoring Program's focus has -- we've looked at environmental justice over the years in this program repeatedly, but the focus is probably more just a broad public health focus, as I would characterize it.

So, you know, public health includes environmental justice, but they're overlapping sets, to some degree.

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CAL/EPA DEPUTY DIRECTOR SOLOMON: So how might CalEnviroScreen inform Biomonitoring California?

Well, you know, various ideas that have to do with geography, with some of the specific indicators in there and maybe some new opportunities for biomonitoring.

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CAL/EPA DEPUTY DIRECTOR SOLOMON: So, first of all, yes, we're looking at communities that are in the top 10 percent in the Biomonitoring California Program. The MIEEP study in the Bay Area includes quite a number of residents from the Bayview-Hunters Point community, for example, which is one of the top 10 percent communities in the EnviroScreen.

The Central Valley BEST study includes many, many residents of communities that are in the top zip codes or top census tract soon in the EnviroScreen.

So should we be looking at that as we prioritize where to do additional biomonitoring studies in the future? Should we be looking at that as we analyze some of the data in the studies that we are doing now, and look at where people live as one of the, you know, one the variables that we're analyzing?

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CAL/EPA DEPUTY DIRECTOR SOLOMON: Various -- some of the factors under population characteristics, such as age, race, and ethnicity are pieces of information that we're collecting on all the participants in Biomonitoring California, so -- and we're getting a very broad racial ethnic mix and age mix in some of the studies. And so is there more that we should be thinking about in that regard? Should we be looking -- you know, doing more,

either targeted studies to more vulnerable groups or more broad studies, so those are issues to consider as we move forward.

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CAL/EPA DEPUTY DIRECTOR SOLOMON: And then there are some indicators that directly relate. Pesticides would be an obvious one. So of the 66 pesticides mapped in the California EnviroScreen that were chosen based on toxicity and potential to drift, 26 of those are already designated chemicals in the Biomonitoring Program. So we could really directly look at those two -- this indicator and our data together.

One of the caveats about doing that is that when you actually dig into the CalEnviroScreen pesticide data, kind of discovered that the ones that -- that are in the top deciles where the pesticide use is in the hundreds of pounds of active ingredients per square mile, those are almost entirely driven by fumigant use, because fumigants are used in much larger volumes than any of the other pesticide active ingredients.

And fumigants sadly are among the subset of pesticides that we don't biomonitor for. And, in some cases, it's probably not feasible to biomonitor for some of these chemicals. So that's a limitation that makes it a little difficult to directly just sort of do a crude

analysis of, okay, did these top 10 percent communities show -- you know, did the residents have higher levels of our biomonitored pesticides in their bodies? It might or might not workout, because of the fumigant question.

Toxics Release Inventory, another obvious one, because, you know, if we've got toxicity-weighted TRI emissions into communities, some of these are metals, dioxins, and a few cases PCBs, and various other chemicals that -- you know, even some of the phthalates, I mean, we could potentially look at, you know, are there associations there?

It's going to be a tricky one, just because, as Dr. McKone has, you know, pointed out in his research, you know, there's the question of how much of an emitted, you know, dose of a pollutant or emitted pollutant actually gets into a person? And that actually does drop off quite a bit when you're talking about, for example, you know, a TRI facility, you know, if you're talking about phthalates emitted from a local facility versus phthalates that might be used in the home. It would be probably -- it would be difficult to tease those apart.

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CAL/EPA DEPUTY DIRECTOR SOLOMON: So additional indicators. Diesel. Very early in the Biomonitoring California Program, this Panel designated diesel as a

chemical for inclusion, in part because of a lot of input from local communities, and environmental justice groups, people out there who are really worried about diesel exhaust quite rightly, because of the fact that it's a known carcinogen. It's an asthmagen. And so we bumped it up to priority chemical, but we've been stuck on this issue of finding a good biomarker.

Is that something that we could get past? Is there new information there that we should be looking at? Because when you look at the traffic data layer in the EnviroScreen, the diesel data layer in the EnviroScreen, even PM is significantly driven by diesel, you know, a lot of the communities that are most impacted are really dealing with air quality issues. So should we be doing a better job in biomonitoring trying to get at these?

So particularly interested in Dr. Quintana's thoughts on that, but also just wanted to raise that for the entire Panel.

And then finally, drinking water. Drinking water is a new layer under development in the CalEnviroScreen. There are a lot of interesting decisions that are going to have to be made about how to design that information, because there's -- there are a lot of different things in drinking water and a lot of different ways to measure those. And, yeah, we have to categorize communities in

some consistent way.

So is there some advice that we could give the folks working on the CalEnviroScreen about ways to design the drinking water indicator layer in a way that it would provide potentially useful information for biomonitoring?

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CAL/EPA DEPUTY DIRECTOR SOLOMON: And then the other issue that I wanted to raise is stress, because a whole major portion of the CalEnviroScreen is getting at socioeconomic factors, such as poverty, educational attainment, basically sort of measures of neighborhood characteristics in one way or another, and susceptibility markers.

And, you know, a lot of these sort of boil down, in terms of their health implications, to, you know, stress pathways. So is that biomonitorable?

Well, there are a lot of folks who have been looking at that, you know, nutritional and metabolic biomarkers of stress, the immunologic biomarkers, the neuroendocrine markers, the sort of concept of allostatic load, where you kind of can put together a number of these different kinds of components into an overall sort of measure of kind of total stress is the theory or some of the metabolomic approaches that might help us get at that, because my bet is that if we went out and just measured in

a lot of the top 10 percent communities in California, that, you know, we'd see some things higher and some lower, but we wouldn't necessarily see a consistent pattern just based on the list of chemicals that we are currently biomonitoring for.

And yet, you know, I think that these communities are facing differential health threats compared to other communities, so how do we get at that? Is there something else we should be adding to our -- you know, sort of to our set of tools in our toolbox that's a little bit different than what we've been looking at so far, and a little bit more integrated?

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CAL/EPA DEPUTY DIRECTOR SOLOMON: And then if you flip the question around and say, okay, how could we help inform the CalEnviroScreen?

Well, this comes to some obvious questions. You know, would, you know, biomonitoring data, in any way, help validate the CalEnviroScreen? And from what I just said, some of that's a little risky. We might actually not find major differences between communities. We might find some differences cutting each way, and I'm going to talk about this in the next slide.

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CAL/EPA DEPUTY DIRECTOR SOLOMON: And so that

could be -- it could be interesting to look at, but we -- you know, it's, you know, a little unclear what we would find. There was a study just published very much related to this topic about a month ago in the journal *Environment International* looking at the associations between essentially poverty -- they called it socioeconomic status -- and environmental toxicant concentrations as measured in the National Health and Nutrition Examination Survey, NHANES, over about a decade.

So they looked at three different rounds of the biomonitoring data from NHANES, and they looked for patterns. And they basically looked at all these chemicals to see if, you know, according to indicator of poverty there were correlations at all. And most of the chemicals measured in NHANES actually were not correlated in either direction with poverty, but some were.

And so, you know, it was a subset of about, I think it was -- you know, there were -- there was some correlation in about 15 chemicals. A bunch of the metals. And as you can see, higher SES had higher levels of metals that are associated with seafood consumption, for example, mercury and arsenic. Low SES communities tended to have higher levels of metals associated either with workplace exposures or housing exposures, such as lead and cadmium.

And then the phthalates kind of split, depending

on which particular phthalate you were talking about. Benzophenone-3 is an ingredient in sunscreen, so that was associated with higher SES status.

And so they did find some things, and those actually would -- some of them would be really interesting to dig into more and follow up on. You know, why some of these were higher or lower in different -- according to socioeconomic status? And then there are some things that we're looking at here in California that might be different, such as the flame retardants, where we could potentially -- we might find something a little bit different than what they're finding nationally.

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CAL/EPA DEPUTY DIRECTOR SOLOMON: And in terms of other indicators, as John mentioned, the CalEnviroScreen is continuing to grow and develop and look for additional useful indicators to consider, and has looked at various other possibilities, drinking water indicator is on track, but we've, you know, considered trying to wrap in indicators on fish advisories. We sort of get at some of this with the 303(d) listing, so that's the surface water contamination.

But, you know, mercury fish advisories have a closer potential link to health. I have up there a map of abandoned mines in California, because that's where a lot

of our mercury contamination comes from in this state. And there are -- so should we be, you know, mapping some of that information in looking at that in relationship to mercury levels?

We've talked about age of housing or other indicators that might capture or get at lead, whether that would be worth including. We didn't in this last round, so that's something to continue discussing and thinking about.

Whether there are other environmental exposures that might be biomonitorable and have geographic drivers, what might those be?

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CAL/EPA DEPUTY DIRECTOR SOLOMON: And then finally, people do create their own micro-environments or they have their own micro-environments created for them. We, you know, don't choose to have flame retardants in our couches, but there they are, and so they're in everybody's home no matter what your socioeconomic status, whether you live in a top 10 percent or bottom 10 percent community in the CalEnviroScreen, your couch is probably pretty much chalked full of flame retardants, at least for now. We hope not for much longer.

And use of -- dietary issues, use of personal care products, et cetera, also are things that are driven

in various different ways that don't -- that might or might not correlate with, you know, geography.

And then work places. As Dr. Quint mentioned, we don't necessarily do a great job getting at worker exposures yet in the CalEnviroScreen, and how can we, you know, do a better job capturing that? And even, you know, we've got the firefighter's study, but are there other worker populations we should be thinking about specifically to start digging into?

So those are the kinds of questions that I had when I thought about potential links.

--o0o--

CAL/EPA DEPUTY DIRECTOR SOLOMON: And basically, you know, there are potential areas of connection between these two tools, two programs, but there are caveats like around pesticides that will make it a little bit methodically, you know, logistically difficult. Should we be looking more at diesel or stress? And then how much to expect?

We can't overhype what we expect to get out of linking, in any way, the CalEnviroScreen and Biomonitoring California, because there's -- you know, there's never going to be a really close correlation because of the fact that so much depends on where you work, where you live, what you eat, and, you know, other factors that are

not -- that don't vary as much by geography as much as by other characteristics.

So thoughts and I'm really interested in hearing from you about what we should be doing.

CHAIRPERSON LUDERER: Thank you very much, Dr. Solomon. You've raised very many thought-provoking items for discussion here.

So I'll ask the Panel members. Dr. McKone, would you like to start.

PANEL MEMBER McKONE: Thank you.

Don't go off.

Thanks. Both of these were really interesting presentations, and especially the issue of bringing it together. So, you know, one of the things, it seems obvious, but I think it's important to articulate that, you know, people who get sick tend to be the ones who are most vulnerable and most exposed, right? If you wanted to find the people for any substance PM or lead or -- you know, you want to find both the vulnerables and the ones with a high exposure.

And, I mean, even though that's obvious, it's hard to really tease out how that works. For example, in biomonitoring, if you're trying to associate the biomarker with a local use, like a pesticide use, it's really hard to do if you only -- if look at the full population, and

also don't have a lot of information of the tails, because you don't see the correlation until you start pulling out the high end. And it's at the high end that then somehow the geography kicks in and starts being important, the local use.

And so what I'm -- what I thought of is the -- you know, this screening tool is very effective probably in -- so because vulnerability tends to scale a bit with geography, or at least by zip code a bit, and we can start seeing certain factors there, I'm still a little concerned about finding the exposure factors that are really good predictors, because they tend to be -- they tend to associate with geography, but then there's all these other confounding factors, which then means that biomonitoring can become very important in the middle between these two as a bridge to sort of sort out how to tie -- when or how to tie the local exposure-related or environmental-related factors to the disease we might be seeing and to the vulnerabilities.

I mean, I think that's where this has to go a bit. And that means not only do we need the biomonitoring data, but we need a rich enough set of biomonitoring data to pull out subgroups. I mean, I think a lot of the diseases happening in subgroups that are -- may not even be in a nice distribution. They're kind of in this 95th

percentile as this little subculture of exposures that are going on that we haven't really found yet.

And once we get at that, I think we can do a better job of this, but that's a bit ambitious. I mean that puts a lot of demands on the Biomonitoring Program. But, yeah, I mean, I'm really happy to see, personally, you know, this effort to sort of build the environmental factors, the community vulnerability, stress and things. I think we underestimate their -- well, we probably don't. A lot of people underestimate the importance of understanding that. We're finding out where you're going to see disease and then we need this bridge to really tie these together. And that really is a selling point for biomonitoring, especially exposure biomonitoring.

So I mean, this is not really a question, but it's things that really occur to me about the value of these different tools and how to bring them together.

CHAIRPERSON LUDERER: Okay. Dr. Wilson and then Dr. Cranor.

PANEL MEMBER WILSON: Thank you, Chair. This is actually -- I want to direct the question to Dr. McKone. And, you know, we're finding our way to this linkage to biomonitoring. And I guess first is a question and then another is a suggestion on a potential overlay of data. Is there -- do you see a linkage between these exposure

metrics and the -- you know, the exposure model that you've developed, the UN model, as sort of a -- as sort of a relative risk ranking tool? Would that be applied here?

PANEL MEMBER McKONE: Well, yeah, there's a couple of models. So what makes life difficult in this realm -- and it's very easy to -- you know, I could put on my hat as an indoor environment scientist, right, and say, why are we bothering looking at pesticide use and air quality, because so much is indoors?

But actually it's more complicated than that. And that's why I really -- you know, when the issue of outdoor and groundwater and other things may not show up much in the median, but we often don't care about the median. It isn't the median where people are getting sick. It's actually the high end, right?

I mean, so if you look at exposures that are high end, they really are cumulative. There's a lot of cases where it's your groundwater and your -- you know, what you're eating, what you're drinking that all come together. I mean, the great story of this is there -- somebody was studying chloroform. And they said there's a community in Wisconsin which is just way out there on chloroform. Why -- or they picked a person who lives in a town that had a paper mill that's bleaching paper and releasing chloroform to the air. They have chlorinated

water because they were drinking surface water. And then they found people who were drinking like all these diet sodas, where there was -- they used to use methylchloroform, right, to extract the caffeine and put it into something -- not diet sodas, but yeah, caffeine free, right, where they extract it.

So they said you take this person, right, or these people who do all of these, and you can't say that the outdoor air concentration doesn't matter. Maybe for the median person who didn't drink the water, and, you know -- or somebody who wasn't living near a paper bleaching plant. So you can't throw out any of these elements. We're really learning how to put them all together. And that's why I say, biomonitoring might be a window to begin to test some of these hypotheses.

So I don't know if I answered your question, but that's the things we're struggling with in some of the modeling exercises for cumulative exposure, you know, with EPA's ExpoCast system, and the international community that's trying to do lifecycle screening is how do you merge together indoor and outdoor and kind of make sense of it. It's not an easy task.

PANEL MEMBER WILSON: Thank you.

PANEL MEMBER McKONE: But I do think it's on track. I mean I had a chance to say that when we reviewed

the model, the screening approach

PANEL MEMBER WILSON: Could I follow that up, Chair, with a --

CHAIRPERSON LUDERER: Um-hmm.

PANEL MEMBER WILSON: I was -- I'm thinking that one of the things that might be interesting. George, you mentioned, you know, the socioeconomic indicators, one being median income. And one of the things that might also be interesting is that California's population is projected to grow from 38 million today to about 50 million in 2050, so about 33 percent population growth. Most of it happening at about four counties, and then some distributed in other counties.

And that -- I'm sort of posing the question if it would be interesting to overlay what the population growth stresses are for various counties with -- along with these data to give us an indication of where the population -- you know, where growing populations are going to be at risk, you know, in a sense, related to what you've found here. Just a suggestion or an idea.

CHAIRPERSON LUDERER: Dr. Cranor and then Dr. Kavanaugh-Lynch and Dr. Bradman.

PANEL MEMBER McKONE: What four counties?

PANEL MEMBER WILSON: They're mostly Inland Empire.

PANEL MEMBER McKONE: Okay. Inland Empire. And Fresno area?

PANEL MEMBER WILSON: Fresno and south.

PANEL MEMBER CRANOR: Thank you. Thanks very much, Gina, for the presentation. I have a small question where the two might come together. From reading that I've done, researchers on the immune system suggest that like the brain, there's one chance to get it right. And so if you have toxic exposures very early in life -- and, I mean, this is a technical term -- you're going to mess up the immune system, right?

(Laughter.)

PANEL MEMBER CRANOR: And you may have the wrong balance between various germ fighting cells, and it will continue for a lifetime. This is Rod Dietert and people that he works with from Cornell.

Is there any point, in sort of a small scale, do -- is there something that could be done to look for the substances that are known, or likely to cause, immune dysfunction in children, and then follow it up immune dysfunction later that comes back to bite you on the other side?

CAL/EPA DEPUTY DIRECTOR SOLOMON: Very cool. Good thinking. Yes. And, in fact -- well, this sort of comes back to diesel which jumps to mind, because there

are -- there's a lot of research by now showing that exposure to diesel exhaust early in life alters or appears to alter the balance of TH1 to TH2 cells. So these are different kinds of T helper cells in the body. And this ratio is -- you know, it seems to be kind of set early in life, sometimes early in childhood.

PANEL MEMBER CRANOR: That's what Dietert found, not for diesel, but for other things. It's set for life.

CAL/EPA DEPUTY DIRECTOR SOLOMON: And there are a bunch of things that can alter this ratio. And a lot of the data -- the studies on asthma now are, you know, looking at early childhood development, and all of the many factors in the, you know, home environment and community environment that can sort of create this more pro-inflammatory ratio of TH1 to TH2.

And, you know, is that something we should be at least taking a look at and seeing if there's anything that we can do in that realm? And some of those kinds of things are mappable, because it's like diesel exhaust exposures. Others not mappable, for example, nutritional factors. Rural factors. You know, there's a lot of studies showing that kids who grow up on farms are less likely to have asthma, and that seems to also be one of these things where if they're exposed to a lot of -- this goes back to this whole sort of hygiene hypothesis of

asthma. And, you know, so should we be looking at rural versus urban in our mapping and biomonitoring?

So a lot of interesting things that one could look at there. And that's -- Dr. Cranor's idea is a really interesting one, because instead of sort of looking at global indicators like, you know, sort of indicators of general stress, looking at trying to look at indicators that have actually been linked in the literature to certain environmental contaminants that we could also then track, such as diesel. So that's very good thinking. Thanks.

CHAIRPERSON LUDERER: Dr. Kavanaugh-Lynch.

PANEL MEMBER KAVANAUGH-LYNCH: Two really good presentations. Thank you very much. I was curious with the community assessments. So in the literature on looking at behavioral and individual and community level factors in health, there's been a distinction between individual level SES, socioeconomic status, and community level socioeconomic status. And so the measure that's being used here is more of an individual level.

And so -- and I was wracking my brain to try to remember if the neighborhood level socioeconomic status has been mapped for the whole state or not. And I think perhaps it has. I know Peggy Reynolds does -- has done work in this area, because she was with the California

Teachers Study, which is statewide. So I think there -- she may have neighborhood level SES factors for the whole state.

And along the same lines I was thinking about local area crime statistics as another measure that might want to be added to the community level assessment, is a level impacting stress and accessibility to a lot of other behavioral and potential protective factors.

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: Thanks. I think a lot of people have said some of the things I was thinking about, but I wonder if there's some utility here in thinking about this in terms of a potential representative sample for the State. And in the absence of a representative sample, could this also be used as a tool to make sure that we're getting information from the full range of communities?

In other words, if we're not doing a representative sample, can we target regions for smaller biomonitoring studies, and make -- use this as another indicator or an additional tool to prioritize where we sample or where we don't sample, and/or evaluate the utility of partnering with groups like Kaiser and things like that, medical service groups, or HMOs that provide services across the state. Again, you might be able to

target regions for those kinds of smaller, but significant, studies that could start to build a picture of what's going on in the state. That might be another use for this.

CHAIRPERSON LUDERER: Dr. Quintana.

PANEL MEMBER QUINTANA: I just wanted to follow up on what had been mentioned earlier about the involuntary aspect of exposure that I believe is behind this CalEnviroScreen. It's really these involuntary exposures, you live next to the Port, you know, of Long Beach, or something like that. And so I wonder if we could look at our biomonitoring chemicals and rank them by how involuntary they are or how relatively less linked to individual behaviors, such as makeup and things like that, because those would be the ones that we most linked, I would think, to CalEnviroScreen, the ones that were -- this community level involuntary type exposure.

Although, I think you might make the argument that flame retardants aren't something we want either. Maybe they aren't community level, but even flame retardants, if we're looking at the ones that are being phased out versus not, are going to show differences between low SES and higher SES. But maybe looking at our list of chemicals from that perspective might be helpful.

CHAIRPERSON LUDERER: Any other questions,

comments from the Panel members?

We can take public comments now and then have some -- or, Dr. Wilson, did you have an additional comment.

PANEL MEMBER WILSON: Sorry. Thank you. Just one last random thought that this -- that's some potential linkage between these data and the Biomonitoring Program is if there's a way to link these to measures of persistence and bioaccumulation, substances that within each of these data sets, you know, are of concern on the basis of their bioaccumulative potential and their environmental persistence, if that's another sort of surrogate, if you will, of actual biomonitoring data as, you know, a thought exercise, if nothing else.

CHAIRPERSON LUDERER: Dr. Fiehn.

PANEL MEMBER FIEHN: Yes. I do have one maybe last question -- comment on that. Somebody -- you know, if vulnerability is a major criteria on the soft population ethnicity issue, you know, I would really encourage to also look in chronic diseases. As somebody has mentioned it, I just wanted to emphasize that. It's not just cardiovascular. It's just, in general, chronic diseases, elderly people, just as important as low birth weight are, asthma, which are more like children oriented. And that was a comment I just wanted to enforce.

CHAIRPERSON LUDERER: All right. Thank you. We have three public comments. So we have 10 minutes allocated, so that's about three minutes each.

So our first public comment is from Rachel Kubiak from the Western Plant Health Association.

MS. KUBIAK: Hi. Thank you very much.

Again, my name is Rachel Kubiak. I'm with Western Plant Health Association. And for those who may not be familiar with us, we represent the plant protectant, pesticide, fertilizer, manufacturers, biotech.

The tomatoes and the oranges come in.

(Laughter.)

MS. KUBIAK: And let me first just preface this by saying I have the absolute utmost respect for Dr. Solomon and for the Panel and for biomonitoring and for all of the things that you guys are doing. I think it's actually really fantastic.

And the point that I actually wanted to speak to was a question that came up from someone on the Panel over here involving the CalEnviroScreen and how potentially moving forward for the next version, maybe 2.0, how that could be overlaid with potential health effects, how that it's not currently a health assessment.

And having worked at Department of Pesticide Regulation for over 10 years until recently, the only

thing that I would bring attention to in specific regard to the pesticide aspect of the CalEnviroScreen, is that although there -- the data I assume is correct, in terms of the pesticide use, that the pesticide use data that's collected by Department of Pesticide Regulation has no correlation to exposure.

And so I think that it's important to be careful going forward that we don't automatically make that assumption, that because we have this map and that there's all of these super red areas, and to someone who doesn't live in my world or doesn't live in our world, that that somehow is an indicator that you live in this flaming hell region of toxicity, and that the use of pesticides in those areas doesn't necessarily equate to exposure.

And so I just wanted to make sure that that was pointed out, that because there's a large amount of use in that area, it doesn't necessarily mean that there's, you know, potentially any exposure.

And so when you start correlating that, especially from an agency where, again, people who don't live in my world, look to Department of Public Health and other agencies as sort of this source of information, and they should, that we don't automatically make those connections.

So that was it. Thank you.

CHAIRPERSON LUDERER: Thank you for your comments.

Our next commenter is Nancy Buermeyer from the Breast Cancer Fund.

MS. BUERMEYER: Thank you again. Nancy Buermeyer from Breast Cancer Fund. I want to thank both the presenters for a really, really great presentation on a very, very cool tool. How fun is that to be able to do all this stuff?

A couple things I wanted to ask about. One, one of the other programs that we worked on, along with Commonweal, was the Health Tracking Program, the public Environmental Health Tracking Program, which, in fact, includes a lot of the chronic illness and health endpoint data that has been asked about here.

And they strike me as similar, although differently focused tools. And so I just want to make sure that we make the most of the very limited resources that everybody has out there, and make sure that these are complementary, and that we use them together. And I had a very brief whisper session with Gina to say that there has been some data taken from the Health Tracking Program for the environmental screen, but I just -- they seemed like really complementary tools, and we should figure out how they can best be maximized for what we're trying to --

what we're trying to get done.

And, in fact, the federal -- the national CDC Health Tracking Program is indeed starting to incorporate some of the CDC biomonitoring data into their tool. So I think there's certainly some opportunities there.

I also wanted to comment on the move from zip code to census tract. One of the things that the Health Tracking Program has done, and they've done it specifically around breast cancer which is why I know about it, most of their data is county level. And sometimes if you look at county level, you don't really see a lot of differences. But when you break it down to census tract, then you get at West Oakland versus Alameda County, and you can really see the very clear distinctions in the level of disease.

So I think, again, that's going to be a really important step. And obviously, zip code is more refined than county, but I think that will be really elucidating of some more of the kinds of connections we'll see between different exposures and possible health outcomes.

And finally, I wanted to ask actually, if any of the work that you guys have done on the CalEnviroScreen has been coordinated with the U.S. EPA, and whether that's something that you guys have worked with them or will take to them?

Again, my world of policy, I've been looking at reform of the Toxic Substances Control Act. And one of the big issues that's coming up is hot spots, and how -- if we -- you know, are we going to be able to? And if so, how are we going to address these kind of hot spots in TSCA reform to make sure that the EPA has a responsibility for identifying these areas of high exposures and mitigating those? And sort of what are the action plans, and, you know, I'd also be curious about what sort of you're going to do with the data, in terms of now that we know there's vulnerable populations, how do we -- how do we funnel resources into fixing those? I think you mentioned a few of those.

But anyway, it's really great work and thank you all for the opportunity to see it and comment on it.

Thanks.

CHAIRPERSON LUDERER: Thank you very much. Our final comment will be from Davis Baltz of Commonweal.

MR. BALTZ: Finally, Nancy gets to go first.

(Laughter.)

MR. BALTZ: Well, my comment, I wanted to sort of follow up on something that Dr. Bradman said. And I think all of us have realized from the beginning of this program that ideally we have enough resources so that we, every two years, do a statewide statistically significant survey

of Californians. So that we have -- establish a baseline, and then we can see if we're making progress, because ultimately we want to reduce exposure to chemicals that we know are hazardous.

So my thought is how to take that. We don't have the resources to do a statewide program. And we're talking about 2,000 samples would be about what we would need. And even applying that to the number of zip codes, it would be one plus person per zip code, so that doesn't work.

But what if we took as many samples as we could from the top zip codes, the most polluted or the highly impacted ones, but with the commitment that we would go back in two years or hopefully additional cycles, and measure the same number of people in those zip codes? And in the interim we -- because there would not be the Biomonitoring Program's responsibility, but linked with the commitment to do something about environmental justice, with some legislators who are interested in moving on this.

You have a program where there is funding available for the Biomonitoring Program to measure the same zip codes on two or three or four cycles. And in the interim, the Legislature, or someone, comes up with a program to design an intervention, so that we see if it's

working, because that's ultimately one of the goals of the program is to use it to improve, to develop policies that will improve public health, and then see if they're working. And we have to go back and measure, again, to see if that progress is happening.

So that's my suggestion. And I know it's a little bit risky to say it in a way, because we've also said from the beginning that the Biomonitoring Program should have impeccable science, and it should not be muddied necessarily with, you know, policy wrapped up and intertwined with it.

So the Program should still be focused on doing the best possible science, doing accurate measurements that everyone can have confidence in. But we need to start figuring out ways to link the data that the Program generates with some ideas to reduce exposure to the chemicals that we're concerned about.

Thanks.

CHAIRPERSON LUDERER: Thank you very much to all the public -- members of the public who commented.

Do we have anymore comments, thoughts from panel members?

PANEL MEMBER BRADMAN: Is this for discussion?

CHAIRPERSON LUDERER: Discussion.

PANEL MEMBER BRADMAN: I have one.

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: I wanted to talk a little bit more about some of the issues raised by -- I'm sorry, what was your name again from the Western --

MS. KUBIAK: Oh, Rachel Kubiak.

PANEL MEMBER BRADMAN: Rachel Kubiak. I think you raised some really important points that should be considered by the Panel and by the Program that relate to kind of the purpose and mission of the Program.

And then also I want to kind of address some of your specific comments. I think one concern that you raise, that I think we have to be careful of, is looking for ecologic associations. And if there's, for example, biomonitoring in an area where, based on population level data, there might be rates -- certain higher rates of illness or whatever, you know, those don't show cause and effect relationships.

And so there's the kind of issue of ecologic associations being associations and not being significant. And then we also have to be careful where we might just assume there's an association because there's a red area and something else, when, in fact, there's not even an ecologic association.

There is some evidence though that pesticide use does result in exposures to communities, and it varies by

the chemical and there's a lot of individual physical and chemical properties. Certainly fumigants, when there's news by the Department of Pesticide Regulation has shown that there's higher levels in air near this -- near where it's used and there's -- you know, I think we can assume if there's higher levels in air, they're higher exposure.

And there's also been some studies with herbicides and some other insecticides showing higher contamination in homes, child care facilities, and other environments probably related to nearby use. And I think that's fairly conclusive, in fact, in some of those studies. But, you know, they're limited and there's -- it's much more complicated than just saying loose use equals exposure, but we can't say that use doesn't equal exposure as well. There are some relationships.

The Program here, in a way perhaps, there's a little bit of mission creep going on that we should address kind of transparently about linking biomonitoring to health outcomes. As Davis Baltz just mentioned, the Program is really focused on biomonitoring. And I personally and think there is kind of a program imperative, to look at exposures, but also consider health outcomes.

And I think to the extent that the Biomonitoring Program can take measurements that inform epidemiologic

studies that are valid studies, that's an important contribution, and that should be considered as projects are planned.

I think we have to be careful when we start getting into issues of risk assessment and thresholds, and that's where we start getting this problem where we intertwine policy and the biomonitoring.

So I think you raise some really important points for the Program to consider. I wouldn't see them though as necessarily out of the question, but moreover they have to be considered carefully to make sure the work we do is most informative for people who are going to use the data.

That's my little speech.

(Laughter.)

CHAIRPERSON LUDERER: Dr. Wilson.

PANEL MEMBER WILSON: I would to sort of like to underscore that. And that, again, it does -- it sort of responds to the point that Rachel made around distinguishing between disease and exposure. And that ultimately, you know, the mission of the Biomonitoring Program is to answer questions of exposure, irrespective of the question of disease.

And I think, you know, this is sort of one of the reasons I was interested in -- you know, could you take these data that have been developed under CalEnviroScreen

and begin to evaluate them through the lens of environmental persistence and bioaccumulative potential, you know, based -- like, you know, really based on Dr. McKone's work showing that as environmental persistence increases -- correct me if I don't get this right, Tom -- that as measures of -- as your environmental persistence increases, the intake fraction increases population-wide. Does that summarize your 10 years of research, Tom?

(Laughter.)

PANEL MEMBER WILSON: Let me just finish that thought though. And, of course, I mean, it sort of gets to a surrogate or measure of exposure that, you know, I think addresses your legitimate concern that we're not talking about making connections to disease. We're trying to answer the question of exposure, and that this may be a way to do that, and that sort of keeping in mind that it also may not be the most health hazardous, you know, sort of lens. We may -- it maybe that diesel exhaust is really the most important one, in terms of health effects, but it is one lens, one exposure lens that I think would be useful. So thank you.

PANEL MEMBER McKONE: Can I -- I'll just follow up.

PANEL MEMBER WILSON: Go head.

CHAIRPERSON LUDERER: Dr. McKone.

PANEL MEMBER McKONE: The interesting thing about the persistence, you know, we did show that the best indicator of the source receptor relationship for very large populations is persistence. And the problem with that is it makes it difficult to get a handle on it locally, because a lot of the, like chemicals that are very persistent also have a very large reach. So they go beyond a zip code. You know, so we do know they end up in the human population, but they tend to go over larger areas. So I think that creates a bit of a challenge for any tool that can only -- I mean, whereas disease tends to be monitored and have patterns that are very geographical.

Some pollutants have a reach, what we call a characteristic travel distance, that's almost continental in scale, which is why we find, you know, flame retardants up, you know, in the Arctic or dioxins all over the world.

It doesn't mean they aren't important, but it means you're going to have a hard time seeing a source receptor relationship, if you're only looking at counties or zip codes or something at low scale.

CHAIRPERSON LUDERER: Dr. Quint.

PANEL MEMBER QUINT: Yeah. I wanted to comment on a point that Gina brought up about stress and chemical exposures or pollutant exposures. And another point about

interest in impacted communities, communities of color, in biomonitoring. When this Program -- before it started, we had a lot of participation, or much more participation, by communities -- representatives of communities of color, because they were interested in biomonitoring, and they wanted to be biomonitored. So I think that there is interest there and there has been interest for a long time.

And I think I am also concerned about, you know, validation, or lack thereof, of measuring, you know, where they're in the dark, areas doing biomonitoring and not necessarily finding anything. But I think not finding anything could be -- you know, if you live in one of these communities, that's a stress, knowing that you're living next to a hazardous waste site, or that you're living in a corridor where diesel trucks are roaming around all the time or idling.

So I think that's its own level of stress combined with many other levels -- many other stressors in these communities. So biomonitoring, something akin to what Davis Baltz suggested, if at all possible, would be a good thing, because not finding something would help to reduce stress that you aren't actually -- you know, whatever we find. I mean, it's going to increase stress if you find chemicals. And if you don't find chemicals,

it might reduce stress. But either way, I think it's been of interest for a long time, and it deserves, you know, our attention in terms of seeing what's possible there.

CHAIRPERSON LUDERER: All right. Well, thank you, everyone, the presenters for those very thought provoking presentations, and the Panel members for a great discussion.

I'm supposed to do a quick summary here. So I will try to keep it short. So we started out hearing from John Faust about the CalEnviroScreen 1.0. He sort of told us that the overarching focus of this project was on exposures, public health or environmental effects from combined emissions and discharges from all sources. And then to also try to combine that with taking into account sensitive populations and socioeconomic factors.

And so the unit is the geographic unit is the zip code and it covers basically all the populated portions of the state. There are 18 indicators, of which 11 are pollution burden indicators. One of the things he mentioned was that the -- in selecting these indicators one of the important considerations was that they should be actionable by CalEPA.

And then there are seven population characteristics that are incorporated into this multiplicative model of the pollution burden and the

population characteristic scores.

He showed us how to use an on-line interactive mapping tool to look at the results, and also that results are available in other forms, via published report that we received and Excel spreadsheets as well, and mentioned something, which was brought up in the discussion as well, that they're now working on census tract scale analyses, which would be 8,000 different census tracts rather than the current 1,800 zip codes.

MS. HOOVER: Sorry, Dr. Luderer, just to interject real quickly. I think for the wrap-up, we wanted to just sort of pull out kind of the action items identified by the Panel, and not go back over the presentations, just cause of we're limited in time.

CHAIRPERSON LUDERER: So I think during the discussion or some of the things that were brought up was as biomonitoring being a possible link between the sort of source use exposure and dose and the health effects. We had -- we heard during the discussion this idea that people with diseases, so -- are probably those with the highest exposures and the highest sensitivity, and that was brought up, I think, by several people.

Also, this idea that chronic diseases may be an important susceptibility marker and something that should be considered incorporating into CalEnviroScreen.

We talked about some specific disease health endpoints of immune dysfunction, and how those -- there's a lot of evidence that early-life exposures to specific chemicals, including diesel, may bias a program immune function for life, and that may be something that could be an area of collaboration between the CES and the Biomonitoring Program.

It was also mentioned that it might be interesting to categorize the chemicals that are currently biomonitored by the Program or on the designated chemicals list, as to whether they constitute voluntary versus involuntary exposures. So exposures to the general environment versus personal behavior type of exposures.

I think there was some -- several comments from the public as well as the Panel this idea of maybe using the CES to identify zip codes or areas where biomonitoring -- the high exposed by the CES zip codes, where there might by utility of doing biomonitoring studies, perhaps repeated biomonitoring over time, perhaps looking at intervening -- inventions between biomonitoring studies.

And then there was also raised, I think in the discussion, this idea that it is important to make links between exposure and disease versus this idea that -- a concern about mission creep, and that the Biomonitoring

Program's central mission really is more on the -- is the exposure side, but that it obviously -- the Biomonitoring Program will generate data that will be very informative about -- can be potentially very informative about health effects.

All right. Hopefully I've captured most of what was said in the discussion. Now, we are going to take originally a 15-minute break. I'm wondering whether we want to shorten that to 10 minutes?

MS. HOOVER: I'm going to suggest that we start back at 3:40, which gives us about 12.

(Laughter.)

CHAIRPERSON LUDERER: Okay. Split the difference. Okay. So we'll come back at 3:40 then.

(Off record 3:24 PM)

(Thereupon a recess was taken.)

(On record: 3:40 PM)

CHAIRPERSON LUDERER: All right. Could everyone please take a seat. We're ready to get started again.

DR. PLUMMER: All right, everyone. We're going to get started.

CHAIRPERSON LUDERER: Panel members, please take your seats? All right. We're going to start back now that we've all had a little break.

Our next agenda item is going to be discussion of

chemical selection planning. We're going to start out with a discussion of four pesticides for possible future consideration as candidates for -- as designated chemicals for biomonitoring in California. And these four pesticides are glufosinate ammonium, glyphosate, imidacloprid and propanil -- propanil, sorry.

We will also hear an update on some other chemical selection activities that are ongoing, so I'd like to introduce Dr. Gail Krowech, who's the staff toxicologist at OEHHA who's going to be presenting the chemical selection planning to us.

(Thereupon an overhead presentation was presented as follows.)

DR. KROWECH: Good afternoon. So I'm -- as Dr. Luderer just said, I'm going to review a preliminary screen on four pesticides. These pesticides were each in California Department of Pesticide Regulation's top 100 -- list of top 100 pesticides, in terms of pounds of pesticide applied.

We want to get the Panel's input on whether or not these -- any of these pesticides should be brought back for further consideration as possible -- as potential designated chemicals.

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DR. KROWECH: And just by way of background, the

reason for the screening, we've been asked to screen pesticides as possible candidates for biomonitoring by the Panel, by State staff, and by the public.

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DR. KROWECH: These pesticides were selected based on volume of use, marked increase in use, and residential -- whether there were residential or consumer uses.

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DR. KROWECH: The screen briefly summarizes the material that we've gathered so far. It looks at exposure sources, physical chemical properties, persistence and bioaccumulation, possible toxicity endpoints, key pharmacokinetic factors, and past biomonitoring studies. For this presentation, I'm going to talk about potential exposure sources and what we know about the availability for biomonitoring.

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DR. KROWECH: These are the chemical structures for each of the pesticides. And I just want to make clear we're not looking at these as a class of chemicals, but each one as a separate chemical.

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DR. KROWECH: The next two slides look at just the type of pesticides and kinds of uses. Both

glufosinate ammonium and glyphosate are herbicides. They're both used in conventional and genetically modified plants -- genetically modified crops. I've listed here some example crops for each one. Glufosinate ammonium is largely not available for residential use. It has some use in terms of spot treatment on recreational fields and residential lawns, but I don't think it's something you can buy at the hardware store.

Glyphosate has a lot of other uses, in addition to the use in agricultural crops, such as use in rights of way and landscape and residential gardens. And it's the active ingredient in the weed killer Roundup.

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DR. KROWECH: Imidacloprid is a neonicotinoid insecticide. It's used on a wide variety of fruits and vegetables. It also has a lot of other uses, in terms -- that are residential uses, in terms of landscape and garden use. It's also used as a pesticide in the product Advantage.

And propanil is an herbicide. It's used exclusively on rice.

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DR. KROWECH: These next four slides show the trend for each of the pesticides. This is pounds applied from the CDPR's Pesticide Use Report. And I just want to

mention again that the use report defines agricultural use to include not only crop use but non-crop use. And that includes parks and golf courses and along roadside a railroad track rights of way.

So for glufosinate ammonium we see this very marked increase. Some of this increase is believed to be due to the increase in glyphosate-resistant -- glyphosate-resistant weeds, and which apparently has, you know, shown that causes an increase from 2007 up. Recently, there was an announcement of a new production plant -- proposed production of a glyphosate ammonium plant in Alabama, which is aimed at doubling the use of glufosinate worldwide. And this is interesting also, because at the same time that glufosinate use is increasing in the U.S., it's being severely restricted and phased out in the European Union, based on the potential for toxicity.

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DR. KROWECH: This is the figure for glyphosate. And in addition to the agricultural use, I've also included the total sales in terms of -- total sales. And I should also say that this figure includes all of the salts of glyphosate. So it's a sum of all of glyphosate salts.

The agricultural use here also, as I mentioned

before, includes rights of way. And that's a fairly large use for glyphosate. It's -- over two million pounds were used in 2011 on rights of way. And also, I think I just want to mention because of that dip in 2004, it's -- I think what you can get out of the blue line, the total sales, which includes home use, institutional and industrial uses, is really the trend.

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DR. KROWECH: This is for imidacloprid, which also has much higher total sales than just the agricultural use.

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DR. KROWECH: And this is propanil, which I'm only showing the agricultural use, because that's its exclusive use. Propanil largely took the place of molinate and that, you know, use declined as propanil's increased. At 2.2 million pounds applied, it represents almost half, 45 percent, of the total use of pesticides on rice. And also of note, propanil is also being phased out in the European Union.

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DR. KROWECH: This slide looks at persistence and bioaccumulation. For persistence, just for screening purposes, we used EPA's screening tool, PBT Profiler, to just get an idea, you know, of possible -- potential for

persistence. And for potential for bioaccumulation, we're listing here the Log K_{ow}. And a Log K_{ow} greater than or equal to 4 is considered evidence of potential bioaccumulation. None of these would be, by that measure, considered to be bioaccumulative.

In terms of the chemicals, I've also listed some of the metabolites and degradates, so I'll just mention them here. 3-MPPA is a plant metabolite and one of the major environmental degradates of glufosinate. It's the plant metabolite in conventional -- for conventional crops. For genetically modified crops, the metabolite is N-acetyl glufosinate.

For glyphosate, AMPA is a major degradate, and it is also the major metabolite of genetically modified plants.

And for propanil, 3,4-dichloroaniline is the major metabolite from soil metabolism, plant metabolism, and mammalian metabolism.

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DR. KROWECH: So in looking at potential exposure sources, we looked for residues in food, exposures from residential use, and detections in the outdoor environment.

In terms of the residue data that we could find on produce and crops, we couldn't find any residue data

from U.S. monitoring programs for glufosinate.

For glyphosate, USDA reported monitoring of domestic soybeans, which were collected in 2010 and 2011 from 20 states. They detected glyphosate in 90 percent of the samples, and they detected AMPA in 95 percent of the samples.

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DR. KROWECH: Imidacloprid was included in CDPR's produce monitoring program, and USDA's produce monitoring program. And in both cases, there were detections in a wide range of fruits and vegetables. And I give some examples of that here.

In terms of propanil, we found studies that reported a residue range, but also another study that reported -- U.S. EPA reported on a study that found no residues in polished or white rice. FDA, in their produce monitoring, reported propanil in a list of pesticides that were detectable and found, but didn't provide any other information.

In 2009, USDA reported produce monitoring -- reported rice in their produce monitoring program. And there was one detection in 435 samples, but there was no information about what kind of rice that was.

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DR. KROWECH: We found one study that looked at

glyphosate in house dust in six non-farm and five farm homes. And they detected glyphosate in 85 percent of the non-farm homes and 100 percent of the farm homes. They detected -- the levels were about a magnitude lower in the non-farm homes than the farm homes.

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DR. KROWECH: This slide was taken from a study of imidacloprid exposure from pet pesticide use. And they treated six dogs with Advantage, which is 9.1 percent imidacloprid. The way that this treatment works is it's a spot-on treatment, where the product is applied at the base of the neck between the shoulders and the -- what was measured was the transfer from the dog's coat to a cotton glove. The dog was petted for five minutes at different increments after the application.

And you can see that the exposure within the first three days is, you know, is much higher, but it continued and was still detectable through four weeks.

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DR. KROWECH: We also looked for detections in the outdoor environment. And this is basically what we found.

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DR. KROWECH: In looking at the ability to biomonitor, here are a series of questions that we'd want

to know. What is the extent of absorption? What is the rate of elimination? And by what route? Is it excreted in urine or feces? Is there a biomarker that is specific for the chemical? Is there an analytical method? Has the chemical been found in humans?

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DR. KROWECH: This slide here shows information that was gathered from studies in laboratory animals, and looks at different rates of absorption for glufosinate. It's pretty low. And it looks like it's very, you know, significant -- high -- in imidacloprid and 3,4-DCA.

All of them show rapid excretion, so this would be a question of, you know, what kind of exposure is there? If it's intermittent exposure, then for these pesticides, it might be difficult to capture. If it's a low level continuous exposure, then it's more of a case of pseudo-persistence and it is something that could be captured by biomonitoring.

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DR. KROWECH: And for the screen, the main thing that we looked at was have these pesticides been detected in biomonitoring studies?

And three out of the four have.

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DR. KROWECH: This is sort of a summary of what

I've just talked about today.

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DR. KROWECH: And finally, options for the Panel in discussing this. The Panel can recommend that the Program gather additional screening information on any of these pesticides. The Panel can recommend that we prepare a document, or documents, to support consideration of one or more of these pesticides as potential designated chemicals. The Panel can recommend that we continue tracking these pesticides or the Panel can recommend that we not not consider these pesticides any further.

And so with that, I'll turn it over to Dr. Luderer.

CHAIRPERSON LUDERER: Thank you very much for that excellent summary. Do we have any clarifying questions from the Panel for Dr. Krowech?

Dr. McKone.

PANEL MEMBER McKONE: There we go. Now, I forgot the question.

(Laughter.)

PANEL MEMBER McKONE: No. These appear to be relatively soluble, right? They're all like really water soluble.

DR. KROWECH: Yeah, absolutely.

PANEL MEMBER McKONE: Does that -- is that an

advantage or is that a problem in terms of detection? You know, are they not going to be stable enough in blood and urine, or are they going to be really easy to find?

And I'm just curious about how big of a burden or a challenge this is chemically for the Program to start looking at them more carefully.

DR. KROWECH: I'd think I'd have to defer to a chemist on that.

DR. SHE: I look around.

(Laughter.)

DR. SHE: I look around. So that means you point to me. So I give a try. Like the neonicotinoid we look at it and found it. I don't know the solubility in the water exactly but people also found in the urine samples. So waterphilic features maybe make it easily go to the possible Phase One Phase Two water reactions, so you can go direct Phase Two to go to the urine. So that's only analytical part I can comment.

PANEL MEMBER McKONE: Yeah. Okay, I just was curious whether, you know, there are issues of things that are -- that very short lived in the body rapidly excreted probably easy to find when they're there, but they're also not there very long, so it's going to be like a really particularly --

DR. SHE: Right. The sample time maybe very

critical --

PANEL MEMBER McKONE: -- highly exposed population, but you wouldn't see it because if you don't get them within a day of the exposure.

DR. KROWECH: Okay. But that goes back to the question of is it a continuous low level exposure, then it wouldn't matter that it's still rapidly excreted.

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: I just had a clarification question. On page seven of the item, it says that 3,4-DCA hemoglobin adducts were detected in blood of two agricultural worker volunteers for propanil. Was that in California workers or --

DR. KROWECH: No, it was actually in Italy.

PANEL MEMBER BRADMAN: Okay. So it's part of that study that's cited in Italy.

DR. KROWECH: It's one of the studies that was cited, yeah.

PANEL MEMBER BRADMAN: And were they applicators or were they like field workers or --

DR. KROWECH: I don't recall. I can look it up for you.

PANEL MEMBER BRADMAN: All right. I can find the paper too.

CHAIRPERSON LUDERER: Dr. Wilson.

PANEL MEMBER WILSON: Thank you. Thank you, Gail, for the presentation. And I had a clarifying question on the table on page six with regard to the bioconcentration factor. Just on the order of magnitude of the -- of these numbers that I usually think of these as, you know, like in the California EPA Hazard Traits. Evidence for bioaccumulation is a BCF of greater than a 1,000 liters per kilogram, kg. And so are these -- you know, so for example, glyphosate is 3.2, is that a -- is that evidence of, you know, very, very low bioaccumulative potential or am I not reading that correctly?

DR. KROWECH: No, you're reading it correctly.

PANEL MEMBER WILSON: So that says that, at least according to EPA's -- Cal/EPA's Hazard Traits, this would -- this is very low potential for bioaccumulative potential.

DR. KROWECH: Correct.

PANEL MEMBER WILSON: Okay.

CHAIRPERSON LUDERER: Dr. Fiehn.

PANEL MEMBER FIEHN: So you mentioned that the European Union banned -- or phased out two of those due to potential health hazard effects. What is the data for the other two? I mean, all pesticides when they're, you know, applied have to go through pretty rigorous testing for many different potential factors. So is there any cause

of potential harm on human health?

DR. KROWECH: Let me answer that two ways. First of all, talking about the two that are being phased out. So, yes, glufosinate it's very clearly potential -- it's a potential for reproductive toxicity. And for propanil -- propanil, sorry. For propanil, they cited their concerns about worker exposure and then ecological hazards, risks to aquatic organisms, risk to birds, and so on.

In terms of the other two, I think it's true, there are a number of studies out. There are still concerns about the other two, about glyphosate and imidacloprid. And I can tell you that, let's see, U.S. EPA is looking at at least glyphosate in its endocrine screening program. They're running it through. There are a number of studies.

And this was just really a screen. And so I put in a table in the document, not -- I didn't talk about it here, but that basically was to, you know, give information that, yes, there is some -- there are concerns and that if we -- if you -- if the Panel asks us to look at these further, then we will do more in-depth work on it.

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: Just another clarification question. Now, I thought glyphosate was measured by CDC,

is that not right?

DR. KROWECH: No, it's not.

PANEL MEMBER BRADMAN: Okay.

CHAIRPERSON LUDERER: Dr. Wilson.

PANEL MEMBER WILSON: Thank you, Chair. I'm just trying to -- I've been -- you know, in looking at these over the last few days, I've been trying to synthesize, and then, you know, with your -- with the information here from the preliminary screen summary, sort of what we have here. And it seems that these are, you know, fairly large molecular weight substances, very low octanol water coefficient, very low vapor pressure, high water solubility, very, very low bioconcentration factor, and yet they have -- some of them have long half-lives, at least in marine sediment and some cases in ambient air. And they've been detected in humans -- three of out the four have been detected in humans.

And I can see -- I can sort of make sense of how they might be detected in the house dust, you know, particularly in the rural settings like you described, because of their, you know, fairly long half-life in soil. And as well as in crops. But I'm trying to make sense of the fact that they've been detected in humans, given these physical chemical properties.

So sort of just -- I don't know if anybody can

help with that. Why are we seeing -- it would seem that these -- unless people were continually exposed, sort of to your point --

DR. KROWECH: Exactly. And we don't know.

PANEL MEMBER WILSON: Yeah, because it looked -- it seems from the data that they -- that we wouldn't expect them to partition to adipose tissue, for example.

DR. KROWECH: Absolutely not.

PANEL MEMBER WILSON: So do you have a sense of why or what is the explanation for why we're seeing them in humans or, you know, why three of the four have been detected? Are we -- and maybe it's -- and maybe we're not using the right measure here. I mean, that's one possibility. There have been some criticism of the bioconcentration factor, because it's aquatic and doesn't take in dietary, for example. They can't account for dietary exposure. I'm sort of just trying to fish around for some explanation.

MS. HOOVER: Just to clarify, you're talking a lot about persistence and bioaccumulation, but we measure lots of things that are not persistent, you know, and don't bioaccumulate and we measure it in the urine. So that's -- it's not a big surprise, like phthalates, bisphenol A. You know, we're not -- so, like Gail already pointed out, if you're getting into exposure, which a lot

of these are high use. They're used in the home. It's not surprising that you would measure it find it in the urine. I don't know if that's help or not.

PANEL MEMBER WILSON: I mean that's what this is -- of course. No, I mean, I guess that's what this is pointing to, and I guess I'm sort of looking for that. If this is suggesting that there's continual exposure occurring, and that's why it was detected, rather than it's -- you know, these are substances that have actually bioaccumulated.

DR. KROWECH: Right. No. I mean, there's no suggestion that they're bioaccumulating and we really don't have that much of a handle on exposure from food. But the only thing -- I mean, this new data from USDA on the soybeans gives you an idea of that kind of exposure.

CHAIRPERSON LUDERER: Dr. Bradman.

PANEL MEMBER BRADMAN: Thank you. Imidacloprid it has not been detected in humans. However, it seems like it hasn't been measured in humans.

DR. KROWECH: Exactly, it hasn't.

PANEL MEMBER BRADMAN: So that should be kind of footnoted here.

DR. KROWECH: You're right. Thank you.

PANEL MEMBER BRADMAN: I should say, I consider imidacloprid actually a fairly important compound that we

should discuss in more depth and consider getting more information on. You know, it's the nicotinyls in general are an emerging class of insecticides. And imidacloprid is also used extensively both apparently agriculturally here. I wasn't aware of that, but it's also used extensively in home environments. It's becoming kind of the termiticide of choice to replace chlorpyrifos, and it's also used on pets very commonly. I mean, there's the study here about Advantage.

And I just know personally, for example, from our study in child care. You know, every time we went into a home-based child care environment, there was a pet, the residents were using, you know, imidacloprid on their pets in the child care environment. And again, it's also -- it's widely used around the home.

And so given that there's also the agricultural component, and given that it's relatively persistent, based on this information in, you know, water and, particularly soil, I can imagine, you know, we found that chlorpyrifos persists over years in an indoor environment that's relatively dry without sunlight. I would suspect that imidacloprid also persists for long periods of time indoors, and that would probably be an example that I would want to get more information on.

DR. KROWECH: Okay. I don't know if we have

to -- that has to be a recommendation of the whole Panel or --

CHAIRPERSON LUDERER: Yeah. This might be a good point for me to just mention that, so we -- one of the things that we need to do is to -- whether we want to prioritize these chemicals, because they would each require a separate document. They're not a group. And so that's -- I think, that's going to be helpful to the Program.

And I'd actually -- I actually had another question about imidacloprid, which was you mentioned that, I think it was, the glufosinate and the propanil are being phased out in the EU. And I know -- I though that the EU was phasing out neonicotinoids, because of the concern about the honey bee death being caused by them. So I was wondering if they're doing anything with this one in particular.

DR. KROWECH: That could would be. I haven't found that, but I don't know. It's just a screen, so I could look into that further.

CHAIRPERSON LUDERER: And I agree with Dr. Bradman's thoughts about, because it's so widely used inside the home and on pets and the persistence in dust that I think that that is an important one to get some information about, particularly because there is no

biomonitoring information available.

Comments?

Dr. Quint.

PANEL MEMBER QUINT: The magic is gone.

Yes, I'm selfishly interested in all of them for different reasons. I think you chose very well. And I'm just wondering, I guess the thing I'm hesitant about is the rapid elimination, and whether or not, even though they -- you know, obviously some of them are hanging around, I'm just wondering -- you know, because we don't do things in a pharmacokinetic way or toxicokinetic way. It's a take one sample. You know, so if you miss it, you aren't going to see anything.

So that -- you know, and I wouldn't want you to do -- I mean, if I had my preference, I would like to see them all designated, but that means, you know, getting more information and doing a lot of work for the Program. And I wouldn't want to do that if there's a chance that the way they're eliminated is going to be a problem, in terms of biomonitoring.

So that's sort of a desire mixed with sort of a hesitation and a question, I guess. And I was just wondering if you had any thoughts about whether or not what you've seen so far would raise particular problems in terms of biomonitoring?

DR. KROWECH: Well, I guess this comes back to the question of what kind of exposure is it? And if it is -- say it's in the -- it's in the home. Maybe it's also at very low levels in the food. If you're getting a continuous exposure, then it seems like even if -- and this is based on animal studies the rapid excretion --

PANEL MEMBER QUINT: Right.

DR. KROWECH: -- but we assume that's the case. Even if that's the case, then you should be able to see it, like the phthalates.

PANEL MEMBER QUINT: Right. Exactly.

DR. KROWECH: But if it's intermittent, if it's only once you use it, and then it's gone, or once you're exposed and then it's -- you know --

PANEL MEMBER QUINT: Right.

DR. KROWECH: So if it's intermittent exposure, then it kind of wouldn't make sense to biomonitor, because you wouldn't necessarily catch it in that window.

PANEL MEMBER QUINT: Right. And, I mean, I'm just interested, because, you know, we have two that are being phased out in Europe, and, you know, the imidacloprid I'm interested in for all the reasons that have been discussed. I just -- and, you know, the propanil. Rice, I mean we have a lot of rice eating populations here.

So I think they all raise very interesting questions toxicologically and otherwise. So we aren't voting yet, or -- but I just wanted to say that I thought that they were all interesting.

CHAIRPERSON LUDERER: Dr. Quintana.

PANEL MEMBER QUINTANA: I guess going back to the EnviroScreen and involuntary and environmental justice, I think just considering that the farm families and the house dust for the glyphosate might be one of those involuntary exposures to these communities in the Central Valley that we saw were so impacted, if we want to start considering that kind of stuff too.

CHAIRPERSON LUDERER: Thank you. And to second that -- to follow up on that, also, even though the house dust levels are quite a bit lower in non-farm homes, it was also detected there. And there is a fair amount of household residential use for glyphosate. So since that was kind of one of the reasons given for maybe following up on the imidacloprid, that I think also for glyphosate that same reasoning kind of applies. It might lead you to believe that there would be more likely to be repeated exposures. So even though it's not persistent, it would be more likely to detect it.

Any other thoughts from Panel members?

It sounds like we've heard some discussion of the

imidacloprid and the glyphosate. Dr. Quint mentioned propanil. So far, we haven't heard any -- a lot of discussion about glufosinate.

Dr. Wilson, did you have a comment?

PANEL MEMBER WILSON: This is -- I just have a question. And it may have been in your materials, but I remember reading that it was -- that these four were selected out of it, was it, the top 100 -- or the top 100 I think reported by DPR. And was the primary selection criteria their trend in terms of usage?

Yeah. Thank you.

DR. KROWECH: Well, the trend was a contributor, but glyphosate, the pounds applied is -- you know, it's -- two of the salts are within, I think, the top 15 of the pounds applied and maybe even the top 10. You know, very high up there. Propanil is number 13 on the list in terms of pounds applied. So they're right up there.

Glufosinate was clearly -- was very much the trend. Just the marked increase in use, and also what is happening in the European Union, and imidacloprid, because of the residential use.

CHAIRPERSON LUDERER: Okay. We're going to take a few minutes now to take public comments, and then we can have a little bit more discussion from the Panel members.

So our first comment -- we have four comments and

10 minutes allocated, so please try to keep your comments to two and a half minutes.

The first comment is from Rachel Kubiak, Western Plant Health Association.

MS. KUBIAK: Thank you again. I'll be brief.

I don't know if actually any of the comments I have to make will have really bearing on what you guys decide or what you're talking about, but just a couple things I was thinking about during the presentation. One has to do with the phaseouts in the EU. And again, I can't help but put my DPR hat back on, in that the EU does things much differently than we do in the United States.

I know in the case, I think specifically with glufosinate ammonium, they -- they're basing their hazard identification on really high dose assays that were done. And, in many cases, as in the case of imidacloprid, they react more politically than they do scientifically.

And so in the case of those chemicals -- U.S. EPA is actually looking also at imidacloprid. California DPR is actually really leading the process in looking imidacloprid to see if it's really what is causing the problems with the bees. That's primarily what it's -- the environmental effects affects. That's happening with that.

So I just wanted to make that point that a lot of

the things that are done in the EU system are done politically. I know they did the same thing with cuprous oxide, which is the active ingredient in a lot of boat paints. They banned cuprous oxide outright in some of the countries in the EU based on the fact that they thought it was causing a problem. And then they had to come back in a few years later and say, oh, the ban did actually no -- didn't do anything. So I just wanted to point that out.

And then also in terms of residue testing in California, I'm not sure where you guys are of residue testing in California, but Department of Pesticide Regulation is constantly doing residue testing on produce and very rarely do they come up with residues that are in exceedance of health hazard standards.

Usually, when we found things actually that were in exceedance of a tolerance that's set by U.S. EPA, it had to do with things that were actually being imported from China.

But again, I just wanted to point that out, because I know there was some discussion about residue testing and stuff. And that's done extensively in California.

And very rarely do we find things that are in exceedance of health hazard levels. I think that was it. Thank you.

CHAIRPERSON LUDERER: Thank you.

Our next comment is from Pam Strayer.

MS. STRAYER: Hi. It's been a pleasure to listen to all of you today. I'm a writer. I'm working on a book about organically grown wines, because of my concerns about the pesticide use in vineyards. And just to your point, the imidacloprid was banned -- I was surprised it wasn't actually in the PowerPoint -- in Europe in the last couple of months for two years because of concerns over bees.

CHAIRPERSON LUDERER: Thank you.

MS. HOOVER: Sorry let me just pipe in --

MS. STRAYER: Sorry. One more point I wanted to make also. And that is, I don't know -- I don't see anyone here from the agricultural pesticide mapping tool, but they have a lot of great information there. It's a fantastic tool to look at how wide-spread the use of these chemicals are.

MS. HOOVER: Sara Hoover, OEHHA. Just to follow up. So, as Gail pointed out, it was just a quick screen, so we weren't trying to be comprehensive. And that was just information Gail come across about the EU, but I just quickly checked it. And the -- thank you, iPhone.

(Laughter.)

MS. HOOVER: So there is a restriction in Europe

on three neonicotinoids, including imidacloprid, for seed treatment, soil application, and foliar treatment on plants and cereals that are attractive to bees. Exceptions will include bee-attractive crops in greenhouses and open airfields or only after flowering. So it's not a ban, but it has been restricted.

CHAIRPERSON LUDERER: Thank you. Our next public comment is from Heather Bolstad of OEHHA.

MS. BOLSTAD: Yeah. I wanted to add the comment about the restriction, but Sara already covered it. And I just wanted to mention that CDFA is currently using imidacloprid in its treatments to control the Asian Citrus Psyllid to try to protect the California citrus industry. It's a really serious threat, because there's no treatment for the bacteria the Asian Citrus Psyllid carries. So these treatments actually occur in residential areas surrounding citrus groves.

So they apply it to the soil in the yards of people's homes, where they have citrus trees. And so -- Oh, I'm sorry. I'm with OEHHA, by the way. And so we, along with California DFA and California Department of Public Health attend public meetings where we're asked, you know, are my exposures of risk and whatnot.

So there is relevance for monitoring imidacloprid at present.

CHAIRPERSON LUDERER: Thank you very much for that comment.

Our final comment is from Davis Baltz of Commonweal.

MR. BALTZ: Thank you. Davis Baltz, Commonweal.

Well, based on the presentation and the comments from the Panel, from a public interest perspective, I don't think there should be too much question about at least carrying forward and making a decision on whether they should be designated.

This is a two-step process, as you all know. Designation doesn't mean you start to biomonitor. It would then need to be prioritized. But given the increased volume and use of some of them, the indoor exposures, which haven't been captured in the agricultural data that Dr. Bradman mentioned, the involuntary exposures that Dr. Quintana mentioned, as well as the bans in the EU on two and a restriction on a third, it would seem like it would be my recommendation to go ahead and prepare documents to consider designating these four pesticides for the Biomonitoring Program.

Thanks.

CHAIRPERSON LUDERER: Thank you. Dr. Solomon, did you have a comment?

CAL/EPA DEPUTY DIRECTOR SOLOMON: Yes. Gina

Solomon from CalEPA. Sorry to jump in.

Two thoughts that came into my head in listening to the discussion. One is relevant to imidacloprid, where I just wanted to sort of, you know, think aloud about whether if you were going to suggest any additional research into imidacloprid, whether it makes sense to either look at the neonicotinoids as a group or possibly take a different approach and look at pesticides that are used commonly on pets, which is -- you know, would cut across different classes.

Fipronil, which is also commonly used on pets, is already listed as a designated chemical. Is it a priority or a designated?

Just a designated.

But, for example, flea collars are commonly used and often they're cheaper, quite a bit cheaper, than something like Advantage. They contain either propoxur or tetrachlorvinphos normally, and I think there might be a couple of others. Those are, you know, ones that aren't on the list and haven't come before the Panel yet. So you could think about different ways of grouping if you're going to -- and whether you want to even go beyond imidacloprid, et cetera.

And then on the herbicides, one of the things that just popped into my head on that is 2,4-D is, in some

ways, similar to glyphosate, in that it has enormous use, and is fairly short lived, you know, short half-life. And it is on the NHANES biomonitoring list. And there's now a number of rounds of NHANES data. And I was actually surprised at how low the detections were. There actually were not a lot of detects, and the levels were quite low. So there are a couple possible explanations for that, and I have actually just asked Gail if she knew. And I think there are some questions about whether they picked the right metabolite.

And then there are also questions about, well, maybe there actually isn't that much exposure, despite the widespread use because of the use patterns and the short half-life and so forth. So it might be instructive to take a look at the NHANES data on other widely used herbicides, and see if we can learn anything from that, you know, in terms of deciding whether to proceed on these.

Thanks.

CHAIRPERSON LUDERER: Thank you, Dr. Solomon.

We do have one additional public comment from Ying Li of CDPH Environmental Health Laboratory Branch.

MS. LI: I have an answer to your Panel.

MS. HOOVER: Get closer to the mic.

MS. LI: At least two minutes and quickly answer

your Panel on this question. About the question about the metabolites and the bioaccumulation, environmental accumulation. Bioaccumulation that's actually reflective to the bio half-life time. Look at the chemical structure, if that's either very high hydrophobic. The molecule -- the chemical must first go through the level to metabolite into hydro -- high hydrophilic molecules, then go through the kidney to excrete clear out.

If that's already very high hydrophilic, that's directly go through the kidney to clearance. And in addition, look at the chemical structure. If contain high proton providers, then that's may have very high protein binding. Protein binding in body, that's also involved enzymes. So that means that could enzymes, you know, acted and chopped the chemicals, or binding on the protein, and then stay extend the time in the body.

So that means extend the bio half-life time. That's what I explain.

CHAIRPERSON LUDERER: Thank you very much. And apropos of that, I think there was data about adducts for one of those chemicals, which would support that.

I just had a quick question for the staff about the comment that Dr. Solomon made about the possibility of groupings. In terms of neonicotinoids, I would think that possibly the measurement methods might be similar. They

could be grouped. Whereas, if we grouped them as pet pesticides, they're probably not going to be able to be measured together.

So I think from a laboratory perspective, the one grouping might make sense, but the other one wouldn't. I was wondering if a laboratory -- Dr. She, do you have a comment on that.

DR. SHE: We saw some neonicotinoid and it's group of chemicals, some laboratory from Japan. They already grouped them together to use a similar method.

For the other chemicals, like the ones glyphosate, it even looks like DAPs structures, kind of like these similar chemicals. And then I don't know if that can be grouped with OP pesticide even to find them or not.

The other ones like propanil, like Dr. Asa Bradman already mentioned is like other -- for me, they look like -- these are like 2,4-D or TCPy these chemicals. So they're really harder to group them at this moment. So possibly we need to do literature search to see how the people find them from an analytic point of view.

CHAIRPERSON LUDERER: Thank you.

CAL/EPA DEPUTY DIRECTOR SOLOMON: Actually, just -- it might be possible, however, to group, for example, tetrachlorvinphos with the other organophosphates

and propoxur with the other carbamates that are already being biomonitored. So it wouldn't be as tidy a grouping, but, you know, it might be doable.

CHAIRPERSON LUDERER: And I see we have a -- I think we're a little bit behind here. We have a couple of other comments from Panel members. I did -- did you want us to rank them specifically?

MS. HOOVER: No. I mean just if you say we want all four, then say we really want this one first, because the basic issue that Gail was pointing out is we're not presenting these as a group, which means it's a whole document on each one of them.

CHAIRPERSON LUDERER: Okay. Thanks.

Dr. Bradman and then Dr. Wilson.

PANEL MEMBER BRADMAN: Okay. I have two comments. One actually relates back to Rachel. You know, when you first introduced yourself earlier, you talked about getting hit by tomatoes.

(Laughter.)

PANEL MEMBER BRADMAN: And I just wanted to say that, you know, everyone is welcome at this meeting, every member of the public. And I think that's a consensus up here. And you shouldn't feel that representing whatever organization you're representing that you're not welcome. And I just wanted to say that publicly.

Then getting to these compounds, I really appreciate what Davis Baltz said. I think that propanil is something that we may, if at all ever, find in a biological sample. It's got -- it's use on a single crop, and it's got relatively, at least -- and again, this isn't complete data, but very low detections in -- at least in rice samples by USDA.

And based on my discussion -- on the discussions that we've had -- I kind of have some opinions already. I don't know if we're ready for that, but I would tend to rank these. I think they're all important. And that's where I do agree with Davis. But if I were to rank them, I would put imidacloprid first, glyphosate second, glufosinate third and propanil fourth.

And I would prioritize -- I'd put it in that order with the highest number being the -- well, the number one being the highest number for prioritizing, just based on the discussions that we've had.

PANEL MEMBER McKONE: Probably not for exactly the same reasons, but I agree they fall in that order. And I -- you know, clearly imidacloprid has some things that make it really stand out. And I don't know if we need to figure out all the details of how to do this. I mean, isn't our recommendation just to go to another step, and then set a priority.

So what I wasn't clear about is how different all of these are. I mean, you know, I can't quite tell the difference. I mean not consider -- we -- I think as -- we have a consensus that all four should be considered at some level. And then I don't know if we should just say, all right go to the next step, prepare documents or continue tracking. I don't know the distinction among them.

CHAIRPERSON LUDERER: I mean I think what we just heard from three people is that the first document should be imidacloprid. And I would agree with that, and someone -- and maybe if any of the other Panel members disagree with that or agree, they could let us know.

And then we had glyphosate next and glufosinate and propanil. It was a suggestion that Dr. Bradman made and Dr. Quint and Dr. McKone, and I seconded.

Dr. Wilson and then Dr. Kavanaugh-Lynch, comments.

PANEL MEMBER WILSON: Thank you. I think -- I might have a friendly amendment to the ranking of the imidacloprid. And I'll have to sort of put this out for the discussion for the Panel, if it makes sense to designate the class of substances that are used as -- used on pesticides for domestic pets basically for designation. And, you know, this may get us into, you know, differing

chemistries. And I'm not enough familiar enough with it to know, but I think sort of to Dr. Bradman's point about seeing the evolution from the previous one, which I don't remember what it was, that you mentioned to this next one that's now on the market, and, you know, will -- may -- we may end up seeing in the next couple of years another one with these same kinds of properties.

And I'm sort of tracking our original work in designating the class of I think it was chlorinated and brominated flame retardants, which felt to me like a smart decision early on to open up, you know, OEHHA to sort of work within that class rather than restricting them to one substance. I just want to put that out as a potential -- for discussion as an amendment to this designating this initial one.

Aside from that, I agree with this -- with the designation of the four.

MS. HOOVER: Okay. So just one clarification, we're not designating. We're just talking about going to a potential designated document.

PANEL MEMBER WILSON: Understood. Thank you.

MS. HOOVER: Okay. And then with regard to groupings, yeah, we always try to go for the most useful grouping, so we don't have to keep coming back. Pet pesticides seems a little bit -- you know, I mean, we

have -- we actually did, what was it, synthetic hormones and antibiotics, I think, used in food production.

So we have done things like that, but we're tending towards, you know, things that are kind of lab groupings, you know, as opposed to use groupings. So that would be something we can definitely look into, like neonicotinoids, for example, as a grouping and work with the lab. And that piece of it, like ability to biomonitor and grouping comes in the designated document. That's where we look into that more.

So you can basically give us any input you want about, well, we want you to try this kind of document or that kind of document. I mean, we're open to that, and we'd certainly look into that.

But mainly, I guess what I want to get clear on is if you think about resources and how much chemical selection and how much effort it is for a single document, my sense from the Panel is you are saying -- everyone is pretty much saying, yes, go for imidacloprid, glyphosate, not necessarily the last two. It seems a little bit less clear. So we would maybe say start with those two, and also look at what possible groupings around those two, is that a fair sum up?

CHAIRPERSON LUDERER: I think that's a fair sum up, but Dr. Kavanaugh-Lynch also had a comment.

PANEL MEMBER KAVANAUGH-LYNCH: Very much related to this discussion, I was just going to make the alternative suggestion that Dr. Wilson didn't make is to do the neonicotinoids as opposed to just the single compound.

CHAIRPERSON LUDERER: All right. Thank you.

So I think that Sara the way you summed it up pretty much the Panel is in agreement on that. I haven't really heard contrary opinions.

So I know we had one more piece of the chemical selection presentation.

Dr. Krowech.

PANEL MEMBER McKONE: Do we need a motion or vote on this now, or is that just --

CHAIRPERSON LUDERER: We're not designating anything, so we don't need to make a motion.

PANEL MEMBER McKONE: It's just advice.

DR. KROWECH: So I actually just want some clarity. So what is the recommendation, to look at the chemicals used in pet pesticides or --

CHAIRPERSON LUDERER: No.

DR. KROWECH: Just to --

CHAIRPERSON LUDERER: I mean, I think imidacloprid and maybe also look to see whether other neonicotinoids could be included with that, and then the

second would be glyphosate and --

DR. KROWECH: Okay. All right.

CHAIRPERSON LUDERER: Dr. Quint.

PANEL MEMBER QUINT: I was just going to say there's already a document from the European Union on glyphosate. Which one -- my brain is not --

DR. KROWECH: Imidacloprid?

PANEL MEMBER QUINT: No. No. Glufosinate ammonium.

DR. KROWECH: Oh, yes.

PANEL MEMBER QUINT: So I think, you know, just -- I mean, you don't have to reinvent the wheel with that, so that's already down in the third category.

DR. KROWECH: Absolutely.

PANEL MEMBER QUINT: I think we're fine.

CHAIRPERSON LUDERER: Okay.

--o0o--

DR. KROWECH: All right. So one last slide, and that has to do with other chemical selection activities, just to let you know what we're working on. And I'll note just one: that we will be presenting a document on potential designated chemicals on synthetic musks at the November meeting.

That's it.

CHAIRPERSON LUDERER: Okay. All right. Thank

you very much.

We do now have time for an open public comment period. We did have 15 minutes, but we're a little bit behind.

MS. HOOVER: Hi. Sara Hoover. I just want to note that the purpose of this too is to let the Panel look at this. This is what is currently on our radar screen and get any input, first, from the Panel, before you move to the open public comment period. Like, for example, this looks interesting or hey what about this one that I want to see up there. Any -- and now we've, of course, just added a couple to our chemical selection activities. So any comments from the Panel, brief comments, and then we can move on.

CHAIRPERSON LUDERER: Dr. Wilson.

PANEL MEMBER WILSON: I think I'm taking us back one slide. I apologize, but I want to follow up with Dr. Quint's point that were you suggesting that OEHHA should come back also with the glufosinate ammonium in light of the fact that those documents have been developed to some degree by the EU?

PANEL MEMBER QUINT: Well, we were -- well, I just didn't want -- I mean, I wanted to just highlight the fact that there is a document. I don't know how good it is, but maybe a review of what's in that document as it

pertains to whether or not we would go further with it would be a better, I think, sort of description of what I had in mind.

CHAIRPERSON LUDERER: Any comments from the Panel about the other chemical selection activities? These are the synthetic musks and organotins are things that Panel members have recommended pursuing at previous SGP meetings, as well as diesel exhaust obviously is something that we had designated awhile back.

Any other comments on that, additions, other things that Panel members feel is missing from this slide?

No. Okay.

All right. Do we have any public comments for the open public comment period?

MS. DUNN: We have one in the room and we have one from on line.

CHAIRPERSON LUDERER: Okay. So we'll take Davis Baltz from Commonweal first and then we'll read the on-line.

MR. BALTZ: It's really just to get clarity for me. So is the recommendation from the Panel to pursue asking Gail to prepare documents on all four in the order that was specified or is it two, and we'll come back and deal with two later?

(Laughter.)

CHAIRPERSON LUDERER: We prioritized them in the order specified. I mean, I --

MS. HOOVER: I mean, I guess -- you know, this is informal. It's informal input, so there's not a specific panel recommendation. We've heard everything you've said and we'll take it into account as we prioritize our workload. I don't think -- you know, we're not going to throw any of these away. We continue tracking, and, you know, look at over time, like which ones are the best ones to pursue, starting with the first two.

PANEL MEMBER McKONE: Actually, just as one of those who said it, I thought we said go forward on all four with this set of priorities, not two and two, right?

CHAIRPERSON LUDERER: Yeah, that's what we said.

PANEL MEMBER McKONE: Okay. So really, we were saying go forward with all four, and then it's sort of up to them, if they can do two now. We gave them the first two and then two later, but we didn't throw any of them out.

Okay.

CHAIRPERSON LUDERER: All right. Would you like to read the public comment that came in via email?

MS. DUNN: So this is from Stephenie Hendricks of Coming Clean Collaborative.

And she says, regarding the dilemma about

communicating the information to the public at large. I coordinate co-releases with multiple NGOs of scientific papers and other reports on environmental health issues.

My comment is that I find it helpful if we understand that there is a natural tension between how scientists communicate and how popular culture communicates. Consider the differences between those who speak French and those who speak English, for example. The good news is that if both the scientists and those helping them to communicate to the larger audiences agree that the information has to be presented in a manner that protects credibility, yet respect the fact that unless it is promotable, unless the media venues can understand how the outreach text will be exciting to and enable them to grow their audiences, then wrangling both credibility and promotability to a -- I'm sorry. Maybe I didn't read that quite right.

Okay. So wrangling both credibility and promotability I think need to be taken into account to create a format that honors both, and that's a process that requires patience and time and also requires the greater good objective and goodwill be shared by both parties.

CHAIRPERSON LUDERER: All right. Thank you very much for that comment.

So we're now at the end of our meeting for today. I want to just announce that there will be a transcript of this meeting that will be posted on the Biomonitoring California website when it's available. And a notice will go out to the listserv when it is available.

And also to remind everyone that the next Scientific Guidance Panel meeting will be on Thursday, November 14th, 2013, and that one will be in Sacramento. So thank you all for coming and the meeting is adjourned.

(Thereupon the California Environmental Contaminant Biomonitoring Program, Scientific Guidance Panel meeting adjourned at 4:46 p.m.)

C E R T I F I C A T E O F R E P O R T E R

I, JAMES F. PETERS, a Certified Shorthand Reporter of the State of California, and Registered Professional Reporter, do hereby certify:

That I am a disinterested person herein; that the foregoing California Environmental Contamination Biomonitoring Program Scientific Guidance Panel meeting was reported in shorthand by me, James F. Peters, a Certified Shorthand Reporter of the State of California, and thereafter transcribed under my direction, by computer-assisted transcription.

I further certify that I am not of counsel or attorney for any of the parties to said meeting nor in any way interested in the outcome of said meeting.

IN WITNESS WHEREOF, I have hereunto set my hand this 22nd day of August, 2013.

JAMES F. PETERS, CSR, RPR
Certified Shorthand Reporter
License No. 10063