MEETING

STATE OF CALIFORNIA

ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

ENVIRONMENTAL CONTAMINANT BIOMONITORING PROGRAM

SCIENTIFIC GUIDANCE PANEL

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

RICHMOND CAMPUS AUDITORIUM

850 MARINA BAY PARKWAY

RICHMOND, CALIFORNIA

THURSDAY, NOVEMBER 3, 2016

10:00 A.M.

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

PANEL MEMBERS:

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

Oliver Fiehn, Ph.D.

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

Thomas McKone, Ph.D.

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

Megan R. Schwarzman, M.D., M.P.H.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY:

Gina Solomon, M.D., M.P.H., Deputy Secretary for Science and Health

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Lauren Zeise, Ph.D., Acting Director

Amy Dunn, M.P.H., Research Scientist III, Safer Alternatives Assessment and Biomonitoring Section

Allan Hirsch, Chief Deputy Director

Sara Hoover, M.S., Chief, Safer Alternatives Assessment and Biomonitoring Section

Fran Kammerer, Staff Attorney

Laurel Plummer, Ph.D., Staff Toxicologist, Safer Alternatives Assessment and Biomonitoring Section

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

DEPARTMENT OF PUBLIC HEALTH:

Robin Christensen, M.S., Biomonitoring California Grant Coordinator, Sequoia Foundation

Jianwen She, Ph.D., Chief, Biochemistry Section, Environmental Health Laboratory

Nerissa Wu, Ph.D., Chief, Chemical Exposure Investigations Unit, Environmental Health Investigations Branch

DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

June-Soo Park, Ph.D., Chief, Biomonitoring Branch

Myrto Petreas, Ph.D., Chief, Environmental Chemistry Branch

Miaomiao Wang, Ph.D., Research Scientist IV, Biomonitoring Branch

GUEST SPEAKERS:

Peggy Reynolds, Ph.D., Senior Research Scientist, Cancer Prevention Institute of California

ALSO PRESENT:

Veena Singla, Ph.D., Natural Resources Defense Council

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. If everyone, could take their seats, we're going to get started.

So I just want to put out some reminders to people here in the room. We'll ask you to please speak directly into the microphone, and introduce yourself before speaking. And this is for the benefit of the people listening via webinar, and also for our transcriber.

The meeting materials were provided to SGP Members and also posted on our Biomonitoring California website. And we have some copies of presentations and other meeting materials available at the entrance to the auditorium, if you haven't grabbed one yet.

Today, we'll take a break around 12:35 for lunch and another short break in the afternoon at 2:55. And you can -- just some logistics. You can find the restrooms and emergency exits to the back of the auditorium there.

And with that, I'd like to introduce Dr. Lauren Zeise, Acting Director of the Office of Environmental Health Hazard Assessment.

ACTING DIRECTOR ZEISE: Thank you, Laurel. Good morning, everyone. I'd like to welcome everyone in the audience, on the web or in the room, and the Panel to this Scientific Guidance Panel meeting for the California

Environmental Contaminant Biomonitoring Program, which is also known as Biomonitoring California.

So thank you all for your participation in this important meeting. Just a reminder of the last meeting, which was held in Richmond last July. At that meeting, the Panel received Program updates and provided a good deal of input on the Program. It discussed with Dr. Benjamin Blount of the CDC his research for the National Biomonitoring Program on tobacco biomarkers and perchlorate.

The Panel also participated in a session on pesticide exposures and biomonitoring. And this included talks by Dr. Paul English of the California Department of Public Health on agricultural pesticide mapping and proximity of pesticide use to schools, and a talk by Dr. Bradman on considerations in biomonitoring pesticides.

The Panel also provided possible input on possible classes for future considerations for pesticides as possible designated chemicals. The Panel indicated interest in considering organophosphorus compounds used as pesticides at the 2017 meeting -- at a 2017 meeting, and also asked that the Program track neonicotinoids for consideration at a later date.

So for information on the July meeting, we have it posted on biomonitoring.ca.gov on the website. And it

includes transcripts, summary of Panel recommendations, and input.

And with that, I'll turn the meeting over to Dr. Bradman, Chair of the Scientific Guidance Panel.

CHAIRPERSON BRADMAN: Thank you, everyone and everyone who's here today, so I'm going to just give a brief introduction and overview to the meeting, as we do with all meetings.

I just want to review the goals and then procedures for public input and that sort of thing. So our goals for the meeting today are actually pretty broad. We want to receive a program update and provide input on new activities being launched by the Program, including the multi-regional study, community outreach and specific environmental justice projects. Look forward to hearing about all those things today.

We are going to be hearing an in-depth update on, and provide input on, semi-targeted and untargeted suspect chemical screening work underway at the Program laboratories.

We're going to be discussing new findings from the California Teachers Study, with our guest speaker Dr. Reggy Reynolds of the Cancer Prevention Institute of California. And we also want to get -- want to a provide input on 2 possible classes of chemicals used in UV

applicators.

We talked about that briefly last time, the benzophenones and phenolic benzotriazoles for future considerations as potential designated chemicals. We also want to review and perhaps suggest some possible 2017 agenda topics for the Scientific Guidance Panel.

For each agenda topic, time will be provided for clarifying questions, public comment, and Panel discussion, and input. And, as usual, for public comment, if you'd like to comment on an agenda item, please fill out a comment card, which can be obtained from the table near the entrance of the auditorium, turn the cards into Amy Dunn. If you're joining the meeting via the webinar, you can provide comments via email to biomonitoring@oehha.ca.gov. And OEHHA is O-e-h-h-a.

Emailed comments relevant to the topic under discussion will be read aloud during the meeting and discussed. Public comments will be subject to time limits. And, if needed, the time allotted will be divided equally among all the individuals wishing to speak on that agenda item. Please keep comments focused on the agenda topics being presented. There will be an open public comment period as the last item of the day.

So I want to now introduce Dr. Nerissa Wu, who will be Chief of the Chemical Exposure and Investigations

Unit of the Environmental Health Investigations Branch of CDPH. And she'll be introducing Dr. Reynolds and also providing an update -- actually the introduction comes later. Sorry. That's with Dr. Petreas.

So anyway, we look forward to your presentation of the Program update.

(Thereupon an overhead presentation was Presented as follows.)

DR. WU: Good morning. Okay how's that?

Excellent. This why we keep Robin around for the turning on of microphones.

Good morning, everyone.

CHAIRPERSON BRADMAN: Dr. Wu, can I interrupt just briefly?

DR. WU: Sure.

CHAIRPERSON BRADMAN: If you could tell us when you switch slides, because we're going to be looking at the slide this way rather than that way.

DR. WU: Oh, of course. Yeah. I feel like I'm speaking right to you, since I'm like 3 feet from Dr. Quintana here.

CHAIRPERSON BRADMAN: Thank you.

PANEL MEMBER McKONE: We're all watching on our computers.

DR. WU: Okay. Well, good morning and welcome

back to our Richmond campus. I am going to go through our usual outline, giving you some Program news, administrative updates. I'll talk about the current projects that we have underway, and then I want to talk about works in progress, the multi-regional sampling plan in particular.

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DR. WU: So budget updates. I'm sorry, change to the first slide here.

As you know, our State funding is made up of our core State budget. We also have some temporary augmentations in the form of some 2-year temporary positions that we are awarded through the budget change proposal process every year. And we've been successful at getting those over the past few years. And we have our $1 million supplemental funding for this fiscal year for focus on environmental justice projects.

And we also have our CDC funding, which is good through 2019. The one thing that might change in the short-term out of this picture, is that as far as I know, there are not these temporary augmentations as part of the 2017-18 budget. What this means is that we do have some temporary 2-year positions that will be expiring at the end of the fiscal year in 2017, which means a decrease in our budget and loss of staff.

Next slide.

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DR. WU: We do have some staffing changes to announce. Rob Voss and Lauren Joe were both epidemiologists with CDPH. Both talented parts of this program. You've seen them up presenting on different projects. And we've just heard that Laurel Plummer, who has contributed so much to this Program and is part of making these SGP meetings run so smoothly, she will also be moving on to another program. All 3 of these staff have made huge contributions, and we will really miss them.

There's other staff news, but I will let the labs bear their own news to you. And we do have some good news. We have Susannah McKay, who is back there. She's joining us as a new epidemiologist at CDPH. She comes to us with a background in molecular biology and epidemiology. She loves data and she says she has a passion for describing scientific findings to a public audience. So we are very fortunate and very happy to have her joining us. She's been here for 2 days, so she won't be up here today, but we'll have her up here soon.

(Laughter.)

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DR. WU: Now, I want to talk about some of the

work we have in progress. Next slide.

And now I'm on the slide with Asian Pacific Islander Community Exposures. This is a project that we've described to you in the past focusing on the San Francisco Bay Area Chinese population, measuring metals -- select metals and the PFAS Panel in adults living in the Chinese -- Chinese adults living in the San Francisco Bay Area.

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DR. WU: We started with a goal of 40 to 60 participants. We actually anticipated that recruitment would be difficult in this population, but a combination of a robust partnership with APA Familiar Support Services, and our recruitment staff, who are really right on things. Recruitment went really well, and we actually expanded our goal to 100 participants. And next week, we have our last blood draw event, and we'll be done with recruitment.

We are anticipating giving back results in the spring for those metals and PFAS, both through the individual results return, which we typically do, but also through some county meetings where we'll be able to talk about the significance of the overall project.

And both of those venues will afford us an opportunity to evaluate our results return materials to a

non-English speaking audience. We do conduct the metals analysis on a rolling basis, so that we don't delay any identification of levels of concern. And we have had some flagged mercury and arsenic levels that we'll be following up on.

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DR. WU: Next slide. The Foam Replacement Environmental Exposure Study, or FREES. This is our collaboration with UC Davis, for which they are collecting dust samples. We're collecting biological samples to look at the change in flame retardant levels over time. We have gone into a participant's home to collect dust and biological samples before they change out their furniture. And then they make a change, either replacing or removing a piece of foam furniture, which presumably contains flame retardants. And then we track them at 6, 12, and 18 months to see how their levels change.

This is on track. We're continuing to collect samples. We have had some changes in the participation. Some people have been lost to follow-up, others have decided they didn't want to change their furniture after all. So we've had some changes, but we've been able to recruit a few more people into this pool. So we actually have an additional few participants.

What it means though is it's a little more

difficult to manage the participant pool. We have some people who are going into their 12-month sampling round, and others who have just joined the sample. So it is elongated and just more administration. But everyone serves as their own control, as their own comparison. And so we'll still be able to look at the decrease over time for each of those participants.

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DR. WU: Next slide, onto Expanded BEST. The last time we talked, we were at the point where we had gone back to participants who had originally had an elevated arsenic level. Fifteen of them had participated in a retest and follow-up exposure survey. And of those, 5 again had an elevated arsenic result.

So we offered them a third round of retesting. Four of the 5 have elected to take us on up that. And as of this point, I believe we have 3 of those samples in-house. And Duyen Kauffman has been reaching out to do some more interviewing about potential exposure routes. And we're expecting the 4th sample this week, so we should be able to have some results soon.

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DR. WU: Next slide looking ahead to our environmental justice focus work. This is a work that has been made possible by that supplemental environmental

justice funding. The priority in this is to determine what our priority is to the communities, to find out what are the issues that are concerning people, how are they working to make their -- to improve their health through environmental means.

We would like to conduct a series of listening sessions to learn more about community priorities, but also to communicate out what can biomonitoring do, and what can't it do, what is the overlap between their concerns and our abilities, and how can we serve the population?

We've contracted with Impact Assessment. This is a very short-term turn around, because it's one fiscal year. And they will be starting to reach out to stakeholders, and advocates, and other environmental groups throughout the State.

Our deliverables from this, we hope we have a database and robust information from these interviews on what their priorities are. And part of the purpose of this is so that we will start to develop relationships around the State that could be turned into partnerships in the future. If we're fortunate enough to have the funding to go ahead and do some of these projects in the future, we'll have already started down this road developing those projects.

Next slide.

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DR. WU: We also are using this funding to implement some studies.

Good morning, Mhel.

You've heard about the ACE Study already in the Chinese population. This funding is allowing us to expand the population to include Vietnamese -- Vietnamese -- people of Vietnamese decent. We are partnering with the Vietnamese Voluntary Foundation, which is a community organization in San Jose.

They're very excited about the project, and they have great community ties offering services, linguistic assistance, and settlement assistance. This recruitment is projected to begin in April. We also have a diesel exposure project, which is in the works. We'll be comparing exposures across neighborhoods and parent-child pairs. And we'll be collecting in 2 different seasons, so we'll be able to do some analyses of seasonal variability. And that is also expected to start up in 2017.

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DR. WU: So what all of these projects give us is snapshots of California. We have a picture of different populations and how exposures are affecting them. But what it doesn't give us is a statewide -- a statewide --

an understanding of a statewide exposure. And I'm on the slide now with the map of California and little pictures.

Obviously, statewide sampling is something that's been a priority of the Program. It's part of our mandate. I don't have to convince you of the benefits of doing a statewide sample. The benefits would bring the Program the ability to track temporal trends and identify exposure hot spots, and derive some hypotheses, which then we could follow-up. These are all great reasons to do a statewide sample.

Next Slide.

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DR. WU: But there are a number of challenges. California is, of course, huge, which present some logistical challenges. And we'd want to get sufficient samples to represent across the many different populations of California diversity, not only by demographics but by the different types of exposures within our State.

Biology is really resource intensive. There's collection of data, and collection of management of samples. There's the very expensive chemical analysis, and results return, and development of educational materials. And the biggest challenge we've always had is funding climate. We've never had sufficient funding, and it's always been a very uncertain climate. So you don't

want to start down the road of preparing a sampling plan, forming partnerships, and maybe collaborating, and gathering samples when you don't know if you'll be able to finish that project or return results in a timely way. So it is something that we have not yet jumped into.

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DR. WU: But lately, we have been looking at ways that we could address this problem and more efficiently gather samples.

And now, I'm on to the next slide, potential approaches. We have looked both within the State and outside of the State at some different tools that might exist that we could use to try to gather a statewide sample. We have talked to the California health interview survey, and other Department of Public Health surveys, like Nutrition and Obesity Prevention, and Tobacco Control Branch.

These all have a statewide survey that we thought maybe we could piggyback on this, add a question, and bring people into a biomonitoring sample -- into a pool of people that we could then contact and follow up for biomonitoring.

And this is actually what the State of Massachusetts does. Piggybacking on the Behavioral Risk Factor Surveillance System, or the BRFSS survey, in

Massachusetts. They've attached a question, are you interested in being contacted for this study on chemical exposure? And the people who answer affirmatively, they then contact them for biomonitoring. So that's one thing we have explored.

Of course, we have our BEST project, which was a surrogate for a statewide sample. And we've also used the MAMAS project, the GDSP Biobank samples as a surrogate. And that might have been our closest to a statewide sample that we've had so far. So each one of these approaches had a lot of merit. They each had something that would lend itself positively towards biomonitoring, but there are also attributes for each of these that weren't so consistent with the kind of sample we wanted to draw.

So on the next slide --

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DR. WU: -- what we've put together is the multi-regional sampling plan, which is little bit of a compromise between each of our concerns. What we're proposing is that we divide California into 8 different regions, and that we'll conduct sampling region by region on a rotating basis collecting 300 to 500 samples per region.

And ideally, if we were given adequate funding, we would be able to cover 2 to 3 regions per year, and

thereby get a sample within 2 to 3 years of a sampling cycle. That would be your statewide sample, and then we'd go back to the beginning and continue this, so that we'd have an ongoing statewide sample.

Without sufficient funding, we can still approach each region, but we wouldn't be able to do them -- we wouldn't be able to do enough of these within 1 year to create our statewide sample. So we wouldn't be able to have a temporal trend. We wouldn't be able to have an overall picture of California.

But what we would have is an in-depth understanding of each region. And what we'd have is the ability to look at hot spots within that region and derive hypotheses still on that regional basis.

Just as an aside, this regional approach is also very consistent with new development for the website, which you'll hear about next year, where the data will be available in a more geographic form, so somebody going to the website will be able to click on the map, and get information about a certain region of California.

So if you identify as a Southern Californian, you can click on that area, learn about the studies that have been done in that area, and see maybe that the multi-regional sampling plan is coming to your neighborhood, and maybe that's something you want to learn

more about. So these 2 maps will be working in tandem to bring that information to California.

Next slide.

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DR. WU: This is just a breakdown of the counties, how we've divided up the State. And this is mostly based on geography, but also some perceived exposure similarities between the different counties.

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DR. WU: So how do we design sampling to represent a region? We want to balance our desire to get a representative sample across a population with also these different community hot spots that we know about, and we want to represent all of these parts of a region.

What we've thought of is conducting randomized recruitment, based on mail routes. We'd select mail routes throughout a region and send postcards to the households within that region. This would be a recruitment packet, sort of like what NHANES sends out to the households.

And we know that the rate of return on these postcards is fairly low. We know that from our experience of BEST sending out letters. It's also not likely to be uniform across populations. So what we'll do is we'll supplement this randomized recruitment with community

outreach, outreach to civic organizations like libraries, the public health departments, a number of different organizations that cover diverse populations.

And what we're trying to do is drive people into this pre-screening pool. So no matter how you find out about the biomonitoring study, through the postcard that you've received in the mail or through one of these other means, if you're interested in biomonitoring, you can go on-line and take this brief survey, which describes your demographics and where you live.

And from that pre-screening pool, we can then select our participants. And we can then distribute them across race, sex, geography, or whatever parameters we're interested in.

This outreach through advocacy groups and the health department will also help raise our visibility, so that the chance, if you get a postcard in the mail, is that you will have heard -- the chance is higher that you'll have heard of biomonitoring. You'll be more likely to answer that request.

Next slide.

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DR. WU: Los Angeles County is what we have selected as our first region. With over 10 million residents, Los Angeles County gets its own region. It's

still the largest by far. We are planning to biomonitor for select metals - mercury, cadmium, arsenic and lead - as well as the PFAS panel.

And we're in the planning phase right now. We are trying to make our protocol as efficient as possible in terms of getting the recruitment going, getting people into the pre-screening pool, collecting the questionnaire information, and then, of course, gathering all those samples, which will be very labor intensive, and then, of course, figuring out how to return results to all of these people in a timely manner.

Our plan is to be in the field 2017 to '18, maybe late 2017, beginning of 2018. Up ahead, we would really like to add more panels, maybe additional chemical panels, as well as looking at longitudinal work, or including children in our population. But we want to get this approach on the ground first, see how it works, and see if we can move from region to region successfully.

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DR. WU: And my last slide, I just want to close by thanking our staff for all of their hard work. As I've mentioned earlier, this is a transitional time for the Program. We have had a lot of staff changes, and it is one of the challenges we're facing right now, but we do have an energetic and very talented staff still. And we

have some momentum on the projects I've described. So I look forward to coming back next year and describing some of our progress.

CHAIRPERSON BRADMAN: Thank you for that presentation. Really a lot of work done and a lot of work to do. So we have about 10 minutes now budgeted for Panel questions, and then 10 minutes for public comments, and then there will be some more time after that for a discussion.

So right now, do we have any questions from the Panel for Dr. Wu?

PANEL MEMBER McKONE: Thank you.

Just second what Asa said. It's really interesting. It's always exciting to see how much you can do with a tight budget.

So the question I have relates to the multi-regional approach. And, I mean, first of all --

PANEL MEMBER QUINTANA: Could you put the microphone on? Sorry.

PANEL MEMBER McKONE: Oh, I thought Asa had it on.

Oh, you have to speak like right there. Okay. I can't move my head.

So the multi-regional study, I think it's really important. And I think most of us would agree that from

the onset, we really wanted to capture regional variation. But in some sense, I also -- I think it's probably, you know, from a scientific perspective and understanding our populations, we're going to see more variability in issues, such as urban versus suburban versus rural, ethnic differences, income differences, the type of people -- houses people live in.

We're all really strong contributors to the variations we would expect to see. I mean, we've learned this from other kinds of studies. So I guess -- I mean, the question is can we do the multi-regional study, which again I think is important, both for the credibility and for the people using this. They don't want to see all the samples done in San Francisco and Los Angeles, right?

It really doesn't get a lot of -- I mean, they go, well, it doesn't relate to me. Although, I think it does. But I think the bigger question is, is to not lose this very important -- very important other categories of variability that we know about.

DR. WU: Yes. I think that's right. And I think -- I mean, this is a challenge, because you have to sacrifice something. And, you know, we want to do it all. So in order to get that regional coverage, we are sacrificing that granular detail within a region, which might show us some of that variability by race, and by

urban/rural, or by whatever exposure.

So, I mean, the vision for the Program really is to have this regional overview. And with our environmental justice work, we'll be still identifying those hot spots. And we're moving towards this better understanding of the population as a whole. It's just -- it just takes a lot of time, and it takes, I think, several rounds of this to really get that robust picture that we all want.

CHAIRPERSON BRADMAN: Dr. Quintana.

PANEL MEMBER QUINTANA: Hi. Thank you for that excellent presentation.

I guess my first question concerns following up on your comments about differences. I've been thinking for the last year in these meetings about what makes California unique? You know, what is different about California versus the entire NHANES program?

And one of it is, at least in San Diego where I live, is the number of immigrant populations. And I don't mean from Mexico and Central America only, but also, I think we have the second largest Iraqi immigrant population in San Diego, a very large Somali population.

And so I think that if efforts were not made to fully include all persons, including those with languages, other than English or Spanish, we might be missing

something again about what makes California unique, but that's also very expensive, at least for our human subjects board. We can't just translate them with our Somali students, or whatever. We have to have a professional translator for all of our documents.

And so I have a study going on right now where every -- we've added Somali, and Arabic, and all kinds of languages. And each one it adds significant expense, at least for our budget, and a challenge for having research assistants that can speak the appropriate language.

However, I think if we are not very inclusive, and also conduct a lot of outreach with these populations, I can't see them getting a postcard in English or Spanish and returning it. It just -- they would just be gone at that point, unless there was very targeted oversampling. And I'm just curious how much you've thought about that issue or how you plan to address it?

DR. WU: We have thought about that quite a bit. And we face the same issues that you face, in terms of the expense and the management of multiple languages.

So let me answer a couple stages. One is for the multi-regional sample. That's one of the reasons we're moving -- we have this hybrid of the randomized recruitment. But you're right, if you get a postcard -- very few people answer those, in general, and it's not a

very good representation of the population, not only by language, but just by who reads their mail and who will return something like that, which is why we're supplementing it with a community outreach. And we're hoping that we get good representation across community groups, so that we can funnel down our information into a number of different communities.

The problem of interpretation is something that we haven't been able to solve for the multi-regional sample. Of course, we'll have information in Spanish, but I don't know that we will be able to do interpretation and translation to other languages. However, on the environmental justice side, when we do our community listening sessions, and are trying to elicit information about what is concerning to communities, then we have the ability to bring in translators for targeted groups. And our hope is that that's where we'll learn more about those particular communities.

PANEL MEMBER QUINTANA: Just a very quick follow-up comment, and I think Asa might know something about this, is that in the National Children's Study, which was trying to be extremely representative, I believe that they were allowed to not have to translate all the materials, but they would just hire a translator for whatever language it was for the visit to that person, and

then they were allowed to consent them and everything verbally from a translator, because there were 79 languages in San Diego or something.

So just maybe look at those -- experience of the National Children's Study and that issue might inform how you might be able to do things. They video consents. They have videos that were made ahead of time, you know, in the languages. Anyway, it's just something that they had to deal with too.

DR. WU: Yeah. Oh, that's good to know and we will look into that.

PANEL MEMBER McKONE: I have -- can I have a follow-up on this also?

DR. WU: Sure.

PANEL MEMBER McKONE: You know, my attitude toward a postcard, if I got a postcard, I probably don't even read it, because it looks like it's junk mail. And I know this is problematic. I'm wondering if you've looked into things like the neighborhood websites, which I thought were silly until I -- you know, my wife starting subscribing and then I subscribed to it. And like 90 percent of it is really stuff like, oh, does anybody have extra boxes?

But people post -- and they're very personalized, because there's -- you know, every neighborhood now has

their neighbor, or they're trying to, you know, there's a service. And it's a great way to get into neighborhoods, if you get a posting. And again, a lot of people won't look at it, but you're going to get, I think, more coverage or more response than a postcard, because it's set up at such a small scale, right? It's really -- and because it's neighborhood scale, it's actually probably related to the language and the culture of the people in that neighborhood.

I mean, some of these are done at like little 5 block radius scales. And again, they're very personal, and very focused on that neighborhood. And if there's a way to get access to that through somebody who can, you know, put it out through the neighborhood network. I know they protect -- they really protect these sorts of things against advertising, so I don't know quite how one gets into them.

DR. WU: Well, we have --

PANEL MEMBER QUINTANA: I had one last -- sorry.

DR. WU: Sorry.

We have spoken to -- well, I've reached out to researchers who post on things like Berkeley Parent Network to see what their experience has been, what kind of population, and what kind of numbers do you get derived from that kind of posting. And that's, of course, a very

particular population.

We have considered doing this, and we have also thought about making the postcards a little more configurable to a neighborhood. You know, we're looking at the Brentwood neighborhood, come join us, to make it seem a little more personal, a little more targeted. And I think that will boost the likelihood of people answering it.

Our hope is also that there will be advocacy groups who blast us on Facebook, and then it gets shared beyond them. And that's where people will then say, hey, did you see this posted on their next door?

So we're hoping there is a little bit of a snowball effect. And I think you're right, that the more configurable we can make it, the more likely that people will respond to it.

CHAIRPERSON BRADMAN: So Dr. Quintana, and then I have a comment. And then we're -- we're actually a little ahead of schedule, but we're using a little more time for this period than we have. However, given that we have extra time, we can extend it, but we will have also time for public comment in a moment.

PANEL MEMBER QUINTANA: I have a follow-up question, which -- what is the targeted ages of who you're going to recruit? What is the age structure of your

population?

DR. WU: We are only recruiting adults at this point, so over 18, and we'd like a distribution across 18 and up.

CHAIRPERSON BRADMAN: I want to make a comment, and then I'll -- so my comment is related to some of the earlier things about recruitment in the National Children's Study, which I think that the National Children's Study actually could be a good learning for us in terms of thinking about this.

Remember at the beginning of the -- when we first started the Panel, we were talking about the National Children's Study as perhaps an opportunity to piggyback on sampling and that sort of thing. And as probably almost everyone in the room knows, the National Children's Study failed completely.

And they used a community-based recruitment procedure. And the enrollment was low, and it was too expensive, and it was not effective. And during the planning stages after spending tens and tens of millions of dollars, probably hundreds of millions of dollars, at the planning stages of the NCS, there was a big debate about whether to do clinic-based recruitment, which is, for example, what we did in Salinas, versus community-based. And they went with the community-based,

because they felt it would get a more representative sample. But the ultimate outcome was that it was ineffective.

So I think maybe all of us and the Program should kind of review what went wrong there and see how we can avoid that, because some of what you just described sounded to me a lot like some of the plans for enrollment in the NCS.

Related to what Dr. Quintana just said, I have a little project I'm doing right now, which is related to contaminants in breast milk, and we did a survey. And we actually used this approach where we reached out to regional lactation groups, and we got connected with people involved in blogs and networks.

And from just a few contacts, we suddenly had 10,000 people filling out our survey. And I think that it potentially could be an effective approach, where it's not clinic based, but it's kind of community based that's targeted, and could obtain people.

But I think we should really look carefully at what happened with the NCS, because that was -- I would say that one is an epic fail in terms of public health research in the U.S.

DR. WU: Yeah, point taken.

CHAIRPERSON BRADMAN: Dr. Schwarzman.

PANEL MEMBER SCHWARZMAN: Thanks so much. I just had one question. I appreciate the presentation, and it's an impressive array of activities that are going on. But again on this topic of the regional survey, I sort of heard 2 different things, and I was hoping you could take a little bit more about it.

One is the limitations of the regional survey that you said might not permit us to understand as much about some of the sort of subregional variation. What Dr. McKone was talking about, you know, rural versus urban and different types of housing and that kind of thing. But you also did mention that as the regional surveys are staggered in time, there are still these benefits of looking at one region before the entire State is covered in terms of identifying hot spots, and other issues like that.

So can you say a little bit more about what granularity will be available and what won't, in terms of the regional versus the statewide? And I'm sure it's based on sample size and the amount of information that you're collecting about participants, like the kind of house they live in, and neighborhood, and that sort of thing.

DR. WU: Right. So there are a number of things we need to balance. Obviously, the number of participants

is somewhat limited. It's very much limited by the resources we have available. Our ability to look at different sectors of the population has a lot to do with how successful we are with recruitment. And that's where a lot of our emphasis is now trying to make sure that we partner with organizations to drive a wide diversity of people into our participant pool.

I can't remember what else I was going to say on that.

But yeah, I mean, there is this -- we would like to, at some point, be able to go back so we do one region, we may derive some hypothesis based on the first pool of participants we have, and then subsequent years, or if we have additional funding through some other source, we can then return to that region and examine some hypothesis that we've been able to come up with, but -- and the other -- oh, this is what I was going to say. Yes, of course, we'd like to get information on all the different exposures that we think might affect metals or PFAS outcomes.

We do -- we are cognizant of the need to keep the survey short though. I mean, I think particularly with large numbers, we're not going to be able to do one-on-one interviews with everyone, so we're looking at different tools, which might be able to collect the data. I mean,

self-filled out questionnaires are not going to be as clean data, but we need to balance any for that against our need for efficiency in getting the data.

CHAIRPERSON BRADMAN: We'll take a break here briefly from the Panel comments and questions and discussion, and open it up for public comment. And I wanted to remind everyone if you wanted to make public comment to submit a request. We have one. If there's anyone else, please do so. But at this point, so I'd like to invite Veena Singla from the Natural Resources Defense Council.

DR. SINGLA: Good morning. Thanks so much for the presentation. And I wanted to comment on the chemical panels for the first region that will be considered the Los Angeles region. And while, as the Panel discussed, this is not going to be a statewide representative sample.

I did want to suggest that there could still be other panels that would provide useful comparisons to national exposure trends, where we've seen disparities in Californians' exposure, for example, with flame retardant chemicals. In particular, we have seen higher exposures in Californians overall for both polybrominated diphenyl ether flame retardants, as well as now emerging research suggests the same trends for the PBDE replacement flame retardants.

And my other comment was that as the sampling plan is developed for the L.A. region, in terms of hoping to encompass a diversity of racial and socioeconomic status demographics, to think about those differences in order to decide what additional chemical panels may be most useful or revealing. If there's been trends previously and disproportionate exposure is seen in certain racial groups or lower socioeconomic status groups, like for the flame retardants or household pesticides, those may be additional useful chemical panels to add.

Thank you.

DR. WU: Those are good comments. Thank you, Veena.

Yeah, we would love to include multiple panels, additional panels to this work. And given resources, of course, we would do that, either for the entire region or for different subpopulations within that region.

We are -- we have selected metals, partly because there is an acute health impact of metals, and because of concern in California in certain populations for metals. We think people will be very interested to get those results.

And the PFASs, of course, there's been a lot of talk about exposure through water and through different

exposure sources. So that, I think, will be very interesting information to get. We'd love to have flame retardant information, to compare to other states, but I think again it's a tradeoff, where, I think, we're going to focus on California and what is the difference across the region. If we can collect that additional information to then have more comparison to other states, that would be great.

CHAIRPERSON BRADMAN: Any more public comments, or any more emails or --

MS. DUNN: No emails.

CHAIRPERSON BRADMAN: Okay. So then we're back then to some time allotted for Panel discussion. I just want to also mention that the clock up on the wall is significantly off. So if you're watching it for time, try not to look at it. It keeps confusing me, even though I have my phone right here.

So again, we have some time for discussion here. And I'm just going to review one item that we heard a little bit earlier about, the diesel study, that there's going to be a follow-up with that. And I just want to -- before we begin that our general discussion today, I want to let everyone know that OEHHA is working to establish an interagency agreement with our group at Berkeley to collaborate on the diesel exhaust -- to collaborate and

extend the diesel exhaust exposure study that we presented as a pilot at our last meeting.

And this study will build on that pilot, and we'll also be working with Chris Simpson at University of Washington. And as you know, we found higher levels of the metabolites -- 1-nitropyrene metabolites related to diesel in children living in East Oakland in Alameda County versus kids living in Salinas. And, of course, there's much higher diesel traffic up here, and that was consistent with the higher levels in the kids that we sampled in that pilot study.

So I'm looking forward to trying to take that to another level. And, of course, you'll be hearing about -- more about this study in the next couple of years.

So now we have some time for discussion, both in relation to what Dr. Wu presented, and then we also have some discussion items related to the environmental justice projects and input from community organizations.

So Dr. Quintana, it looks like you have a question immediately, and then I want to make sure though we address the environmental justice questions too.

PANEL MEMBER QUINTANA: I guess I'm just concerned about this population-based sampling approach, because if it's not done right, it has no value. You know, if you don't have the resources to -- because the

value of NHANES to the data nationally has been extraordinary, due to the fact it's fairly representative. So as it becomes less representative, it becomes less useful, and maybe the resources are better spent targeting certain environmental justice populations, rather than trying to do one, if it's not enough resources, to do it.

Because as you said, it takes extraordinary resources to do it right. And maybe we should revisit the design in a way that if you're looking for hot spots, which you keep saying, you can only find hot spots -- your best chance of finding a hot spot, so to speak, is if everyone is the same -- the same age, for example.

You know, if everyone is the same -- let's say they're all 5-year old kids, you could find a hot spot much easier than if one person is 60 and has a high mercury, and then one person is 20 and doesn't, and -- you know, there's all these things that vary besides -- in their life besides their mercury level, you know.

DR. WU: Right.

PANEL MEMBER QUINTANA: And so I think that if you're really looking for hot spots, to be honest, and I'm -- this sounds like I'm criticizing, I'm sorry, but I feel like the Scientific Guidance Panel is supposed to give the picture.

DR. WU: No, it's really valid points.

PANEL MEMBER QUINTANA: You know, so, I mean, I feel like if you really want to look for hot spots, which you keep saying, we should maybe change to doing everyone like all 5-year olds, or something like that, where you could really try to eliminate other differences and look for those clustering. And we had talked before about using the alpha-fetoprotein 16-week banked samples, which are about as good as representation of the State of California as you could get in trying to use maybe existing samples instead and doing surveys based on those. And I'm just curious about how those efforts have gone too.

DR. WU: Okay. Well, you've described the tension in our Program between the community-based and EJ-focused sampling and the statewide samples. And, I mean, I try not to think of them as a dichotomy, because I do really want them both driving towards the same goal, which is to figure out what we all, as Californians, are exposed to, regardless of what subpopulation you're part of.

My hope is that we will sample broadly enough, so that we will identify people. And I get your point that you might miss people or identify something -- misrepresent something as a hot spot, just because it's a different kind of population. But I don't want to limit

our recruitment across another strata like only looking at one age group, because I don't know what our recruitment success will be like.

I'm a little concerned starting with a smaller pool than we have, and then not being able to recruit in it, so -- but I understand the concern that you have there.

Moving on to the MAMAS, I think we've talked about this the last time. The MAMAS was -- it does cover 70 percent of pregnant women of California. So it is very representative. But because the way the samples are collected, and because there's a very small volume, and it's only serum, there's a limit to what we could examine in those samples. So we are continuing to -- and analyze MAMAS samples. And there are certain uses I think that will be helpful -- that they'll be helpful for, but I don't know that we can use them for our overall statewide sample.

CHAIRPERSON BRADMAN: Dr. Schwarzman.

PANEL MEMBER SCHWARZMAN: Thank you. I have a question about the Foam Replacement Environmental Exposure Study. And this is a fairly basic question, so forgive me if I'm mixing this study with another one that I've heard about. Do I remember correctly that this was targeting low-income housing --

DR. WU: Um-hmm.

PANEL MEMBER SCHWARZMAN: -- and providing some support for that replacement of furniture?

DR. WU: That is the right study. So we recruited mostly around the Bay Area much, and then Green Science Policy had additional funding to go into a San Jose community housing project, and that funding was available to -- for the residents to actually replace the furniture. So it did support the purchasing of new furniture.

We were only able to recruit a few participants in that cohort. And so there's not going to be a great comparison based on income. We -- they are part of our sample pool though, and they will be getting their first round of results. We won't be able to do much statistically with it, but we'll have some anecdotal information on that.

PANEL MEMBER SCHWARZMAN: So that was only the focus in the San Jose cohort, not in -- or San Jose recruitment, not anywhere -- not in the northern Bay Area.

DR. WU: That's right.

PANEL MEMBER SCHWARZMAN: Okay. I just think it's so intriguing, and I -- to do an intervention study, at the same time as an exposure study. And I'm sort of curious to think about how the Program might think about

other interventional studies, because they're so revealing, and that way that you talked about, about the sort of issue of finding controls, is much simplified. And they can be so revealing and so helpful for targeting action.

DR. WU: Yeah. I do think the information from the study will be very interesting. As far as design of intervention studies, I have to say that choosing something -- choosing a chemical panel for which there are multiple chemical exposures, and an intervention that's pretty intensive - replacing a sofa or furniture in your home - it makes for a very difficult study to administer. It's a little more easy -- it's a little easier to say don't use this product for a week.

And so wrangling of the participants trying to, you know, time when they're going to get their furniture, making sure that they select furniture that doesn't have flame retardants in it, and the timing of getting back into their homes, it's very labor intensive, and it's one of the reasons it's sort of a small-focused study.

But I hope that the information -- I hope at the end of this we have information that really does it make a difference, is changing out of the furniture really a primary way to reduce your flame retardant exposure? And the second part of this, it would be great to have some

information with those older sofas. If it's older sofas that are the problem, then we really need to be concerned about this environmental justice issue, and maybe we would focus there in the future.

PANEL MEMBER SCHWARZMAN: One more question on that study, if I may. Are you collecting other data about potential -- or sort of survey data in partnership with that about other potential exposure sources or other ways that they try to reduce exposure to flame retardants?

DR. WU: Yes. We have a fairly lengthy questionnaire for this study talking about occupation and hobbies, any kind of other -- any other kind of home work they might be doing in their lives, their diet. And at each interval, we are asking if any of those things have changed.

CHAIRPERSON BRADMAN: So we have an opportunity now for both discussion, and clearly there's more follow-up questions.

PANEL MEMBER McKONE: Okay. You know, when you showed the 8 regions of California, it seemed intuitively correct, but I guess I was curious -- I mean, you know, I'm look at the map, from what I know, I think they capture certain characteristics. But how did you go from 50 counties to 8 regions? I mean was there a process that...

DR. WU: Some of that was based on our assessment of how many samples could we collect in a year, and how many regions -- the logistics of setting up a region, and the desire to get a statewide sample within 3 years. So that's kind of how we came to the 8 regions.

When we started dividing up the counties into regions, it had to do with just trying to balance the number of residents, which is somewhat successful, though there are obviously some regions that are super populated compared to like the northern tier.

But we wanted to also think about some common exposures that some counties would have, and also the logistics of getting to counties like not having sampling on both sides of the Sierras or something like that. So it was an iterative process. And, you know, it's -- we're starting with L.A., which is just that one county. So there is still time to tinker with the other regions, if you have suggestions about how we might better divide that up.

CHAIRPERSON BRADMAN: Do you have more questions about the study?

PANEL MEMBER QUINTANA: Go ahead. I have lots.

CHAIRPERSON BRADMAN: Well, I wanted to switch gears a little bit and just -- you know, there is this -- there was a slide where you talked about environmental

justice projects and community outreach and identifying environmental justice communities and outreach to groups. And I know -- I think maybe some discussion here about, you know, who else should we be talking to?

One thing I tend to feel about these meetings, for example, we tend to be weighted towards Northern California and the Bay Area. And there's some groups that I think would be very interested, if we did a little more engagement. Just actually yesterday and this week, I've had some contact with, you know, West Oakland Environmental Indicators Project, and Communities for a Better Environment. And there's a lot of groups that are very specifically interested in some of the things we're measuring and some of the issues we're dealing with.

I think perhaps around implementation of the Kettleman City, CalEPA settlement agreement are going to be some opportunities to address environmental justice and community concerns. And that might be a place to target biomonitoring, or perhaps if there's work done in that region to consider those communities, and that might help direct the projects.

And I'd be interested in hearing both more from people here, and also in other staff and communities about what else we could be doing to do outreach and engagement with -- with community groups and those representing, you

know, what we call, environmental justice communities or really just communities in California.

Do you have any comments or also any comments from the Panel on that?

Go ahead, Dr. Quintana.

PANEL MEMBER QUINTANA: This is related to both the environmental justice question and the L.A. County study design, because I guess following up on your comments earlier, I think from a community point of view -- and I work with environmental justice communities in San Diego and in Imperial Valley, mostly U.S.-Mexico border related, but also a little bit in San Bernardino and up there. They are interested in urban rural differences. There's a very strong interest and belief in Imperial County about exposure to pesticides. And we heard a very nice presentation in July about that.

And L.A. county does have some rural pieces, but like Ventura has, you know, pesticide exposures in that area. But it would be nice to see urban/rural really incorporated in the first go-round, even if there's not many to analyze the samples, but to collect and archive, which is an extremely important part of your first round, I would think, is to archive samples related to communities.

And incorporating your comments, the more I work

with communities, and I came up -- started from a lab scientist point of view, but I've been working -- because we're the School of Public Health, and we work with the communities. The communities want solutions. They don't us to come in and say, oh, you guys are contaminated. That's not what they want. They want to have it tied to an action that you can do.

And so, for example, following up, let's say we're looking at pesticide exposure. And one main route might be air, but it also might be house dust. So to even think about could we -- even on a subset of participants -- collect dust or something in case pesticides came up high, we found out it was in the dust, because people understand they could reduce dust in their homes. It provides an avenue of something you can do about it, or even an intervention study.

And so I think if asking communities before you start the project, what matters to you, might help inform how you do it, I guess.

DR. WU: For sure. And I totally agree with the urban/rural split. One of the things we've been doing with Impact Assessment, who will be running these -- the outreach is to think about the slices that we want to make sure we include, and clearly across California, because we have mostly a Bay Area presence, but the rural/urban as

well as across race and across other demographic markers is really important. There are all sorts of water-related issues in the eastern part of the State that we want to include for sure.

In terms of environmental sampling, yeah, we would love to have a subset of our population, have dust, hand wipes, all the associated environmental samples that would be so informative in terms of exposure sources. Yes, we would love to.

CHAIRPERSON BRADMAN: So if I could just maybe prompt a little more discussion on a couple issues. This would be related both to your presentation and some of the discussion we've had. We've talked a little bit about the diesel exhaust project, and I think this also relates to this multi-regional study.

Any thoughts from both Program and from the Panel on the use of CalEnviroScreen? And, you know, I have felt that that's really an opportunity there to really examine public health issues in California and exposures in health outcomes. And, you know, I just wanted to suggest that we try to make use of that tool and how we can best use it.

DR. WU: Sure. That is definitely one of the tools that impact assessment is using.

Oh, I'm sorry. Go ahead.

MS. HOOVER: Sorry. This is Sara Hoover.

Yeah, I just wanted to slightly redirect that question a little bit, because, yeah, we are going to be use CalEnviroScreen quite extensively. We're already -- in fact, Laurel is moving to the program, the same section that does CalEnviroScreen, so we're hoping to have a more integrated approach. So that's going to be a key tool in terms of identifying highly exposed communities. We haven't specifically talked about it for the multi-regional study, but we're definitely using that tool for the diesel study.

CHAIRPERSON BRADMAN: Exactly, yeah.

MR. HOOVER: But I --

DR. WU: And for the EJ outreach work to identify community pockets.

MS. HOOVER: But I also just wanted to pose the question more broadly, depending on who's in the audience, just even anecdotally, experience of where is there high diesel exposure in the Bay Area? The focus of the diesel study will be in the Bay Area. Obviously, we're aware of the Port of Oakland, but we just wanted to put it out there to the public and the Panel just thoughts about besides CalEnviroScreen, which is a great tool, are there any other suggestions about identifying communities highly exposed to diesel?

PANEL MEMBER SCHWARZMAN: 880 corridor.

MS. HOOVER: Yeah. So Dr. Schwarzman just mentioned the corridors, and we're aware of that. And that also will be picked up on CalEnviroScreen. You know, and we've talked about areas in Richmond, but I just wanted to put it out there, since we're in the design study, if anyone has other thoughts about pockets, you know, of concern.

PANEL MEMBER QUINTANA: As someone from Southern California, can I ask why is it only the Bay Area instead of say the U.S.-Mexico border with all the diesel trucks?

MS. HOOVER: It's strictly a resource issue. So this particular piece of funding, as Asa just mentioned, OEHHA is setting up that study. And the reason we're setting up that study is because this one-time funding, the EJ funding, arrived this year with a one-year time limit on what to do with it. And it was split in a particular way, not exactly the way that we had proposed it to be split.

So OEHHA was actually given $250,000. And we had to come up with a practical approach for carrying out an EJ study as quickly as possible. And I had consulted with Asa, consulted with a number of our stakeholders internally, and came up with this idea of the diesel exhaust exposure. But just given strictly resources, we need to base it, you know, locally where we are at this

moment.

However, it's got the same concept that Dr. Wu is referring to, which is we see it as a first step. So we see it as a -- kind of a modular study, the similar idea. We carry it out here. Could we then take it to L.A., could we take it to the border, and do more with it? So that -- and that will just be dependent on resources.

CHAIRPERSON BRADMAN: Dr. Quintana.

PANEL MEMBER QUINTANA: So, one issue that's an environmental justice issue. I presume you're collecting information on house characteristics and use of air conditioning, open windows, because -- use of particle cleaners. Again, ideally, if you had more money, being able to clean up the air indoors would save particle -- portable particle cleaners might be a great addition, like you were saying, to have an intervention and see if we can actually do something about it. But I know funding is limited and so is time.

CHAIRPERSON BRADMAN: Right. And this particular -- again though, this particular study is in the design phase. So any input, like you just mentioned, is really helpful.

PANEL MEMBER QUINTANA: Even a pilot intervention might be helpful to the community.

CHAIRPERSON BRADMAN: Sara, do you want to say

something?

MS. HOOVER: I just -- thank you. And yes, we welcome all ideas. We have -- we have a lot of ideas in terms of also consulting with local agencies and finding ways to do environmental sampling, getting more money to do small grants. Great idea to try to nest a small intervention study in it.

So we have -- you know, we're looking at as wide a possibility, in terms of collaboration and ability, with the focus on, you know, conducting a legitimate study of comparing a highly exposed community to a community that is known to be less exposed to diesel exhaust. That's the core.

PANEL MEMBER SCHWARZMAN: Feel free to just dismiss this if it's 2 ideas that may not be relevant. One is school bus exposure. So I don't know if there are populations in the Bay Area that highly depend on school buses. I know not all do, because the more urban areas tend not to.

But I know that in the past sometimes that's been a reason for high exposure in some groups. And then my other thought was to investigate areas where there have been a successful intervention about no idle rules. Some ports I think have done that, and not all. And I don't know how completely they've been implemented, and where.

But that's one thing that I would think to investigate a bit is the existence of bans against idling, and whether there are regional differences about exposures based on those bans. I don't know if you have anything like high enough numbers to try to look at that, but maybe even for thoughts of future studies.

DR. WU: Do you have a response? I think that was more addressed to you.

MS. HOOVER: Yeah, no, that's just -- yeah. Thank you. Great idea. We're taking notes. We're nodding our head, as Dr. Schwarzman speaks. And again, you know, every -- anyone listening over the web can also feel free to send us comments on the multi-regional study, the recruitment plan, the environmental justice outreach. We always accept comments, not just during the SGP meetings. So we're always available to accept input on all of our studies any time you want to send it to us.

PANEL MEMBER QUINTANA: Perhaps someone can remember details about this, but I just saw an email -- was it last week or the week before? -- about a settlement, State of California where they're going to put in high efficiency filtration in schools. And I just can't remember the location of that settlement. But that might be an interesting before-and-after population. And I just saw the email. It was maybe a week or 2 ago. Gina

is nodding her head.

CALEPA DEPUTY DIRECTOR SOLOMON: South Coast AQMD.

PANEL MEMBER QUINTANA: That was an interesting population. You may need to collect samples from before and after, or something, you know.

PANEL MEMBER SCHWARZMAN: There's an intervention you don't have to -- there's an intervention you don't have to manage.

DR. WU: That's right.

(Laughter.)

DR. WU: If you have -- if you recall that email in more detail, that would be great.

CALEPA DEPUTY DIRECTOR SOLOMON: (Nods head.)

MS. HOOVER: I think that Gina Solomon in the audience just said that was in the South Coast Air District.

DR. WU: Okay.

MS. HOOVER: Can I switch gears and throw another question out there?

CHAIRPERSON BRADMAN: Sure. Yeah, we have a few more minutes.

MS. HOOVER: One of -- so Dr. Wu was talking about all these different plans for listening sessions, and outreach, and trying to draw input from communities

across the State. But one piece of that that we're planning is a newsletter, so a new Program newsletter, but aimed not at the technical audience, but at the community audience. And we've been bouncing around ideas about, you know, what kinds of topics we might consider covering. But I'd like to open that up to both the Panel and also the listening audience about ideas about what people would like to hear about from the Program on a -- on not the level, like a Scientific Guidance Panel level, but on a more accessible level, I guess I would say.

CHAIRPERSON BRADMAN: Go ahead, Dr. McKone.

PANEL MEMBER McKONE: I'm not in the world of the modern Internet but I have a son who works for CBS. I'm just amazed at how news is distributed now, not the old way. It's all done through social media.

And do you have a Facebook page? And like -- and the reason there's an advantage to that, if you have a newsletter, and you're on Facebook, somebody reads it and goes click, you know, and then it goes to thousands of their friends. You know, it's like oh a newsletter.

And, I mean, it's a really powerful way. I didn't really understand this, until it was explained to me by somebody younger, how this world works. And, you know, if you don't have -- you can send out a newsletter and it can sit somewhere or be posted on your website.

But if you have a Facebook site, you have a newsletter there, it's very powerful, because people can click it, and then it can just end up amplifying, or not, depending upon if -- you know, somebody has got to be interested in it.

(Laughter.)

PANEL MEMBER McKONE: It just takes a small number of people to click on it and then it gets -- starts going out all over the place.

DR. WU: We do want to distribute our newsletter through various means, because obviously Facebook will address one population, but leave out others. So we want to use a real range of media. Our hope is that we post it on the website -- and we are somewhat restricted in what we can put out on media ourselves, but that a newsletter that can be shared through PSR or through other advocacy groups can then be shared. You need to get into that stream of sharing and then -- and that's when your broadcasting really becomes larger, but that is something we are thinking about.

CHAIRPERSON BRADMAN: I also think again getting back to my comment earlier about representation that, you know, we should probably spend some time just getting on the phone and making some cold calls to community groups that may be interested, and not just community groups, but

other stakeholders.

I had a round of calls yesterday with groups in the East Bay that are interested in diesel issues. When we were developing the National Children's Study in Kern County, which fell apart because of the larger problems, you know, we were able to develop some real dedicated people and groups in that project, because we were addressing environmental issues.

And they were not your typical environmental justice group. They were neighborhood clinics, and local medical providers. There was a whole cross-section. And I think there's a constituency out here for this Program that we're not reaching. Typically, at these meetings there's -- you know, there's -- over the years, there's been typically 2 or 3, you know, nonprofit advocacy groups that are represented here.

And I think we can broaden that. And I think just literally getting on the phone and trying to reach out to people that you wouldn't normally expect. There's also groups like unions. Certainly, United Farm Workers and other unions who are interested in exposure issues.

There's also, you know, industry groups. And certainly -- usually, we tend to see them when there's a, you know, specific issue related to their interests. But I think there's a whole broader community out there of

people who are potentially interested in this program, and that we should get them involved, or at least invite them more directly than the mechanisms we're using now.

DR. WU: Yeah, I think you're absolutely right. And we're hoping to cast our net wide. And, you know, we have this problem of broad coverage or really deep coverage, and with one year and limited resources, which we keep coming back to, I apologize, but that is a reality of what we're looking at. But I think this is a first step. We keep saying "pilot".

CHAIRPERSON BRADMAN: Exactly.

DR. WU: You know, we make these introductions, we start forming these partnerships, getting on the phone with people. You're right, that personal contact is so key. And you're -- this is -- these are issues that affect everybody. And so it is our job to get our word out there.

And I think by making our media broader by having a newsletter in addition to the website and the other excellent work that OEHHA does to get our name out there. This newsletter will reach yet another audience.

CHAIRPERSON BRADMAN: Dr. Quintana.

PANEL MEMBER QUINTANA: I think there's no substitute for someone going in person to a meeting and explaining stuff to people in the community. At least the

communities I work with, it's not calls or emails or logging onto a webinar in English for 5 hours or -- you know, it's just not going to happen.

But you have to go there and it costs money, you know, from the State to travel, and send people, and send people with language skills. But I think there's -- if you really want to reach communities, you have to travel, you know. And I'm just thinking of maybe having a module that any time anyone from the State goes to some environmental justice meeting, for example, they went -- all the hearings around the Exide lead thing in L.A. There's all these State people that went there from OEHHA and from the Department of Toxic Substances.

You know, maybe having someone either take or -- some materials that have a little table or something, you know -- or a meeting that we were at in Imperial Valley in the Environmental Justice Summit meeting -- Environmental Leadership meeting -- always have a little thing for California Biomonitoring with language appropriate materials, because there's always -- there's stuff going on. We're just not plugged into it, I think, you know.

MS. HOOVER: Can I just make a quick comment on that? It's funny, I was just about to mention this other idea that we have discussed internally and, that was proposed to us by the L.A. Chapter of the Physicians for

Social Responsibility, which is to develop little trainings and do exactly that, so -- but on a community -- community-based level, so describing -- so some of the topics that Nerissa was mentioning about saying what Biomonitoring can and can't do, they were really excited about the idea of us actually coming down, you know, having meetings hosted by them where we would do some of that work. So that's something we're discussing, definitely.

And we've had some -- I've had some experience with that in the past about targeting particular audiences. And we have, you know, hoping to broaden our health education, staffing, and start tackling some of that work.

DR. WU: And we do have plans to be on the ground. I didn't mean to imply that we'd only be making phone calls. Because we're working with Impact Assessment, they have a little greater ability to get out into the field, and they have extensive experience with community facilitation. So there will be on-the-ground meetings as well.

PANEL MEMBER QUINTANA: I meant in the context of promoting the whole program, rather than their specific recruitment.

DR. WU: Yeah, absolutely.

CHAIRPERSON BRADMAN: So we're about out of time. We've used up our extra time at this point. So thank you so much for your presentation and discussion. We're going to move on to the next agenda item, which is laboratory updates. And I wanted to introduce -- we're going to have Dr. Jianwen She from the -- Chief of the Biochemistry Section in the Environmental Health Laboratory Branch in CDPH. And also after that, Dr. June-Soo Park, Chief of the Biomonitoring Branch in the Environmental Chemistry Laboratory from DTSC will also be providing an update.

So, Dr. She, we look forward to your presentation.

Thank you.

(Thereupon an overhead presentation was Presented as follows.)

DR. SHE: Thanks, Dr. Bradman for the introduction. Good morning, Panel members and audience. Today, I will provide an update for Environmental Health Laboratory in last 6 months. Laboratory skipped the update in July.

So next slide.

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MS. CHRISTENSEN: Jianwen, you have the clicker.

PANEL MEMBER McKONE: It's good to say next slide.

DR. SHE: Oh. Thank you.

So my update will include staff change, method updates, ongoing projects, recent publications, and future work.

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DR. SHE: I'd like to use this opportunity to welcome Dr. Rosario Amado-Sierra, Dr. Shizhong Wang, Mr. Li Fang, to job available in one of the programs. And Dr. Rosario is -- I think, if you are in the audience, please stand up, so people can -- Okay. Dr. Rosario. And I think Li maybe -- Li, are you in the audience?

Oh, he's there.

And Shizhong is busy in the labs.

(Laughter.)

DR. SHE: Dr. Rosario is funded by the Association Public Health Laboratory. Mr. Li Fang is a visiting scholar from Zhoushan, CDC, from China. As you all were aware, Biomonitoring Program have funding issues. We try to use other opportunity, other small contribution to the staff. So we apply for the grant to invite visiting scholars.

And Rosario is funded to do the unknown screening, or we call the semi-targeted analysis. He responded to our application. And Li Fang has come here to help us develop some new methods, also get some

training. Shizhong Wang continues to work on the PAH method. We hope we can, in the future, develop it into a diesel biomarker method.

And we have vacancies - a sample manager. And actually, I heard from Robin the positions are already offered. This CDC-funded position.

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DR. SHE: For the method update, I like to focus on arsenic speciation, semi-targeted analysis, and development of master method.

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DR. SHE: We are working on many methods as improvement or expansion of combination. Arsenic speciation is one of the methods I use as example here, which is a targeted method.

Why we do it? One part is because we lost the previous staff. We need to train the new staff, but also there is transition period we look for. Okay. What's the problem we maybe have with the previous method? So if you can see the previous method detection frequency for the arsenic V is 0 percent.

So we said, okay, for arsenic -- to redevelop this method, we may need to make some improvement, which requires the detection limit improvement. So that with a new method developed by Dr. Key-young Cho. He's able to

improve, especially arsenic V detection limit from 1 to 0.02, which is about a 40 times improvement. We hope for the future study, we can improve our detection frequency for the arsenic V.

And other method we are working on I'll just briefly talk about. We have a PAH method needed to restore. So far we are successful. We're still working on perchlorate method, and a few other methods. I hope I can update at next meeting.

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DR. SHE: So this -- with this improvement, we like to see the improvement on the detection frequency, as I mentioned before.

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DR. SHE: And for semi-targeted analysis -- so we can call semi-untargeted or unknown screening. Many names, terms was used. Why I chose semi-targeted, I believe that's -- it's easy for laboratory management. And semi-targeted means we may have a library, at least that we can reference for. It's not purely unknown. All we know the parent compounds. So this is kind of in between a fully untargeted and the targeted analysis. So we use the term of "semi-targeted analysis".

We use a compound -- sorry. Benzophenone group chemicals are the model chemicals to start with, because

we're already working on BP-3. We know something about the chemicals. And our approach now is from a mathematic point of view. Consider all of the combination, looking for the metabolite of benzophenones with this kind of substitution groups - 5-hydroxy, methyl, methoxyl, chlorine, and sulfur. As a substitution group exhaustively how many possible combinations there. We turn out with 72. And then we said, okay, let's target this 72. So that's our approach.

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DR. SHE: We have a whole exhaustive list combination on the left side. I called a compound name. That's a wrong title. It is all possible combinations. And then we use the mass spectrometer tools to lead us to see what we found out.

So just -- this slide shows our approach, and this is exhaustive list. This corresponding compound you know -- may be familiar with the names -- and the chemical formulations exact mass is base structure of this compound.

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DR. SHE: With this new approach, we found some chemicals beyond what we previous targeted. For example, we targeted BP-3. Now, we know BP-1 may be there. BP-4 may be there. BP-6 may be there. BP-8 may be there.

There's another one trihydroxy-BP may be there. Six out of 6, because we do replicate analysis. We do 6 urine sample analysis. We only look for what we have cutoff.

This chemical for us to say we found it must be above 13, 3-fold on the response. And also how many samples hit -- 6 of 6 samples hit. Also excluded some found in the blank samples.

So on the last column of this slide, you can see, okay, we found it. And we also confirmed what we mean -- confirm by the standard to look for them. So some were founded. We need to confirm them. Some -- also, some of them we know is a combination found, but we do not know the chemical structure, so we call it unknown founded. Still needed to be confirmed. We found a lot.

So from this 72 combination, you can see that's a lot of work to do. So our approach, that's -- again, elucidate why we take this approach instead of saying, okay, look for all of the chemistry domain to find something. So this is a proof of concept if we can make some success.

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DR. SHE: And this is a guess for a little bit more technically -- I mentioned like confirmation with mass spectrometer tools. For example, we said we find that hydroxy BPs and that which the compound at the bottom

of this slide. That's a spectrum of it.

So we found commercially there are 2 chemicals available. We run a spectrum. We turn out. It matched with top 1. And that's the one we called we confirmed it. So we -- of course, we have other criteria, like retention times, exact mass, isotope profile, and to help -- to support our confirmation.

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DR. SHE: And so now I talk about the target analysis, and the semi-target analysis. And then I switched master method. Why laboratory develop so different paradigms. I think that here that each method try to address certain questions.

For example, the targeted analysis we can report results back to the participant. But the semi-targeted analysis play a major role for identifying new biomarkers. May help identify what's unique for California biomonitoring, what's emerging chemicals. But we will play a less role for results return.

That's a transition, and that method will be continued. So that's what -- be further quantitative -- supported by quantified method to do the quantified result return. So this master method have developed one part to follow-up this untargeted analysis. Also, on the other hand, like Veena does comment consider about -- okay,

California have limited resource, how you consider multiple panels? The study design we are not able to analyze individual panel of chemicals, but can we combine all of the chemicals into one comprehensive panels? So that use the same kind of resource, can we do more -- support multiple panel analysis?

So at this moment, we combined 3 individual panels together, which include environmental phenols about 10 compounds, and new BP groups, and phthalate metabolites. So on the right column you can see our detection limit actually very well on the standard levels. We still try to work on the urines. But based on this initial primary test on the limit of detection, we see some promising future about this method, because it matched our current individual method.

So, of course, like every tool, in our toolbox, have its limitation. I think a targeted analysis like beam of laser. This kind of like a Swiss Army Knife. And then untargeted analysis, like the bigger -- how you call it? -- detective tools. And then each of them have its benefit, at the same time have its disadvantage.

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DR. SHE: For the -- this is a continuation of the master method for 3 panels I already talked about, that we look for the detection limit, we look for the

dynamic range, we look for calibration curve. They are all satisfactory.

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DR. SHE: I skip over these things.

And next part of my update is include what we have done to support ongoing project. And so far, we're still working on FOX samples analysis with current method, and with enhanced BEST sample analysis, PETALS study, and ACE analysis. So next few slides show where we are.

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DR. SHE: For the FOX study, and we look for the OP flame retardants for 3 of the chemicals. BCEP, and we work on 83 samples. We finish analysis. We ready to report the result.

For the Enhanced BEST analysis, we did -- actually, we improved the method, but we have some difficulty. Our machine is broke down. We will repair it. So we hope -- the method actually looks better. So we almost there to analyze these 218 samples.

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DR. SHE: For the PETALS study, which is collaborated with Kaiser hospitals, we promise to analyze 1,800 samples. So far, we've almost finished 500. Data is already reported. And I hope we -- in the future, we have a chance to invite Kaiser to talk, if they have

someone stage the results to share with us.

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DR. SHE: For new study, ACE Study, and -- on the right column is our status and how many samples we analyzed. I will not read this details. You can see from the slide yourself, if you want to know data.

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DR. SHE: In -- this slide summarize the laboratory's lead publications. And you can see it covered a wide range. For example, the first one is a review invited. And the next one is method of development, and some toxicity studies, collaboration with Professor Bin Zhao on the Dechlorane 602 and with the UC Berkeley on HERMOSA studies. And also the -- our visiting scholar published on other new studies.

Last study is a project study on the FOX samples. I want to talk a little bit about the second-to-last study is unknown identification method we published, which used a different approach than I presented.

This study used the approach combine the possible metabolite pathway with MS2. So we are very successfully identified some fluoride compound as a metabolite in that. So my presentation on the unknowns is a continuation of our previous work.

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DR. SHE: In many areas, we still keep working on it. Here are the examples. We show 3 parts. And so we need to retest some arsenic speciation for E-BEST with improved arsenic speciation method. We still have almost 1,300 samples to do with PETALS study.

And as I mentioned before, as biomonitoring grant, some kind of -- not big enough to conduct many studies. Cotinine is on -- we heard SGP Panel in the past ask us to do the cotinine. Without the resource, we cannot do it. But fortunately, from position 99 fund us with $200,000. We split with e-cigarette. We get 125 K to develop a cotinine method. So that's responded to the requirement from the SGP panels.

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DR. SHE: And for this cotinine method, I just have one slide to show, which metrics we work on, which analyte we may work on to ask advice from Panel. So as you know, cotinine is a biomarker of nicotine. Nicotine has a very short life. And so for the cotinine have relative longer time, and also a lot of metabolites of cotinine trans-3'-hydroxycotinine, also found in the serum samples.

And we pick up these 2 analytes in the serum, because the CDC have a method in serum. But, of course CDC have a method in the urine, which cover much wider

spectrum of cotinine metabolite at this moment, because one-time fund have time limit. Give us one year. We decide and say, okay, let's analyze only these 2 analytes in serum.

Thank you.

CHAIRPERSON BRADMAN: Thank you for that presentation. We have a few minutes right now budgeted for any questions from the Panel, and then we'll have some opportunity here -- an opportunity here about the work at DTSC.

Dr. Fiehn.

PANEL MEMBER FIEHN: Thank you Jianwen She. That was a great introduction into your strategies and progress you've made so far.

Can you please explain why you chose benzophenones as first, you know, type of compound to target? I mean, there's many ways we could target things, and why those?

DR. SHE: We pick up BP-3s, and then one part of them, for example, enhanced program monitor BP-3. But I heard from last year's meeting in the Riverside presented by New York program that said, okay, why you only monitor for BP-3? We found BP-1 is there. And then, at the same time, he -- Dr. Kannan he said okay. BP-1 may be also at a significant amount of compound.

And he also said, okay, you reported parabens. Parabens have a lot of metabolites. So his words, his discussion with me said, okay, you may miss something on the exposure levels or underestimate it. You will relate the sunscreen chemical exposure, if you only monitor the BP-3. So that's one part of the reason.

Second part, we also discuss with colleagues in OEHHA and at -- within the Program under I think the literature search by Dr. Laurel Plummer and others. And they also think about how we do a class of chemicals. We look at the BP group, the base structure, is fixed with the substitution group connected to the manageable isomers.

And we can pick up different chemicals, for example, like polyhalogenated dioxin, which polyhalogenated -- but which you have possible 3,000 isomers. And so that combination is the technical part combined with the program need, and that's considered.

PANEL MEMBER FIEHN: So what would be the next class of compound you look at?

DR. SHE: That's a good question. We may need to discuss with you on that part too.

(Laughter.)

DR. SHE: If you have any suggestion -- this is a -- a proof of concept, but that's really a good

question. We think next group of chemicals, and we also say -- think, okay, can we combine the class together. So we start with one class, parallel class, combination of class. That's what we think.

If you have -- I haven't thought about it. Sorry about that.

PANEL MEMBER FIEHN: Well, we have -- we discuss every time classes of compounds we are interested in. We nominate those. And obviously, it would be a wise choice to look at those, right?

DR. SHE: Yeah, maybe --

PANEL MEMBER FIEHN: I think that's maybe why we discuss those.

DR. SHE: Yeah, maybe Panel give us some, you know, suggestion. Actually, now we get with that initial success, we think it's a good way to look at.

PANEL MEMBER FIEHN: In terms of your targeted master lists, are these basically combinations of methods where you look at them in terms of extractions, in terms of chromatography, and SRMs and then combine them, or do you also use their exact mass assessments, using an exact mass instrument?

DR. SHE: Combination method we use different instrument platform. We use accurate mass measurement high resolution tools. We are not combined with original

cheaper core tools. Does that answer your question?

PANEL MEMBER FIEHN: Yeah. I guess I'm asking are you making a multi-targeted MRM method, or are you making a PRM method on Q Exactive, I guess?

DR. SHE: Yeah. Actually, we are not trying to use multiple MRM method. We use a full scan, combined with a data-dependent analysis, or data-independent analysis, or you call it a Swiss army knife kind of approach, instead of traditional multiple reaction monitoring.

PANEL MEMBER FIEHN: I see. I think that's a very cost effective way and very fruitful way. And I think also promising and, you know, it's the way the science should go. We cannot have more and more classes nominated, and always complain about lack of funding. We have to make those more integrated methods work.

DR. SHE: Thank you.

CHAIRPERSON BRADMAN: With that, why don't we take a pause from the discussion, and we have a presentation from Dr. June-Soo Park from Department of Toxic Substances. And then we'll have more opportunity for Panel discussion and public comment and follow up to the laboratory presentations. So we can continue.

Thanks.

(Thereupon an overhead presentation was

presented as follows.)

DR. PARK: Thank you very much. Good morning, everybody. My name is June-Soo Park.

June-Soo Park.

(Laughter.)

DR. PARK: I showed up here once in a while. Myrto was gone on vacation, but always good to be back here, but I lied.

(Laughter.)

DR. PARK: So this is -- thanks. So I'm going to next slide

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DR. PARK: So this is 2 outlines. I'm going to briefly talk about the status our current project, and mainly focus on our untargeted suspect chemical screening, maybe somewhat similar what -- different from what Dr. She described at his talk.

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DR. PARK: California Teachers' Study. I'm sure Dr. Peggy Reynolds, our guest speaker in this afternoon and also PI of this study, she will cover more details. So briefly, we have completed all the analysis out of 2,000 serum samples.

Our PFAS data, our PBDE data been reported. They are under statistical analysis. And the PCB

organochlorine pesticide result from a little more than 1,000 serums currently on the data review at final stage. So I expect to release them at the end of November, this month.

We also conducting metabolomic study using subsamples of this study. I will talk one more time later in my presentation. And the FREES Study. It's ongoing FREES Study. We've been analyzing urine and the serum samples for flame retardant, and their metabolites, together with the hand wipe and the foam samples.

We're also conducting MAMAS. More than 500 samples for the analysis of routine POPs. Beside expanded PFAS, we remember -- we used to analyze 12 PFAS. Now, we expanded it to 35. So we applied this method to ACE Study too. The preliminary result from MAMAS seemed promising, so I hope we can show some data at the next SGP meeting.

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DR. PARK: So now untargeted suspect chemical screening in blood. We are using high resolution LC, liquid chromatography, time of flight mass spectrometry. This is exactly what it look like sitting in our lab.

So my slide to this topic is arranged in the order of a background experimental workflow, like data acquisition and process, and some preliminary result, and some current future work related to this topic in human

biomonitoring.

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DR. PARK: So why QTOF -- why QTOF screening? We heard so many times, so many chemicals have released and a thousand new chemicals are releasing to the market every year without proper tests on toxicity and the human health impact.

So this is good example. First one -- yeah, this one, the PFAS. We're familiar with that, but I just mentioned that we used to measure only 12, now expanded to the 35. But reported there are 4,000 PFAS chemicals in the market. There's no way we can keep it up.

Same story with pharmaceutical and consumer products, pesticide, flame retardant. We just had PBDE banned not long ago. But all the alternatives and the replacement PBDE creating the same story -- same story in the environment.

So what do you hope from conducting this study -- QTOF screening? We hope to set up some type of a -- some type of a early warning system to the public for the chemicals of some potential concern. That's what we hope.

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DR. PARK: For this purpose, we used cat as a surrogate for the human, because they share a similar indoor environmental exposure pathway as humans. Worked

better. In our earlier study, we found a cat contains 5 to 10 times higher levels of POPs compared to the humans. So presumably other chemicals too. This is important for this type of work, because time of flight technique is generally known to be less sensitive than the tandem mass spectrometry. We use it for target analysis.

We have some leftover volumes available from our previous study, both normal and hyperthyroid cat. Also, this study requires only 250 microliters, so we could afford. So we believe this exploratory study can be easily adapted for human biomonitoring studies. I'm going to talk about later this talk.

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DR. PARK: So this is our publication early 2016 this year regarding PBDE levels in the cat. In this study, we reported some dramatic decrease of PBDE levels in cat. Since regulatory action was in place, we compare 2008 samples to the 2011. And also from the recent year, we also found some positive association of PBDE levels to the cat hyperthyroidism.

So for the screening purpose -- for the untargeted screening purpose, we took 5 hyperthyroid cat and randomly choose 5 normal cat, and did some analysis.

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DR. PARK: So we used the very basic, very

simple -- the protein precipitation method together with the extraction. We added a methanol and then homogenized it, and the -- oh, sorry about that. I keep forgetting next slide. Right now, I'm at the slide number 8. So we use very simple extraction technique, and add the methanol with few internal standards. We homogenized them and spin it and take supernatant, and evaporate and reconstitute with same solvent as a mobile face, shoot in the LC system.

Next slide.

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DR. PARK: So this is a very simple workflow chart for the QTOF. First, we did a full scan using negative ion. We injected 3 times per sample. So total -- you know, the 5, 5 -- 10. Thirty injection plus 1 blank, so additional 3. So I'm seeing the 33 injections total.

So we extracted molecular features. Feature means the -- you know, the potential -- you can think of potential chemicals, but not yet to be identified, so -- but it contains all the information like accurate mass, retention time, and the peak intensity.

So we have these features all lined up based on the mass accuracy, retention time window. Then in the -- we apply some QC filters. Like, we inject 3 times. So

got to be detected 2 out of 3. Also, peak sizes should be larger than our blank, which is background. Also, the peak size should be large enough to survive our cut point, in this case, 8,000. We apply 8,000.

So then after that, using all the survived features, we send them back for the realignment. Then it gave us about -- a little less than 1,300 features.

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DR. PARK: Then I don't want to trouble you, you know, the -- but I just want to show you how it look like -- how method looking -- it is when you display all 1,300 from low to high and across all the injections. So you see the normal cats sitting over here, hyperthyroid cat sitting over here with a number of features.

So in order -- maybe some of us sitting here can tell more information from out of this one, but not me. Only thing I can see is some boundary here. I can see the 3 injections per sample, and also the -- I can see more yellowish color over there. And I can see this circle over here has some like high intensity features.

So that's why I love Venn diagram like this. It simplify all -- everything, but it works for me. So based on Venn diagram, you know, comparing between these 2 -- comparing these 2 groups, it showed about 1,200 features overlapped. It means that it detected in both normal cat

and hyperthyroid cat. And the 57 features were detected only in normal cat, and the 69 were detected only hyperthyroid cat.

So out of these features, unfortunately -- okay. So, I'm sorry. I'm still in the same slide. So we were able to identify only less than 20 percent from using our database in-house. That counts around 250 features. So -- but that's good enough for us, using these features identified.

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DR. PARK: But, you know, the -- this is a list of our libraries. The first that we -- we have about 100 flame retardant, and 250 PFAS library. Consumer product library has a little bit larger -- more number of chemicals, 2,500. We also have largest database, U.S. EPA Tox21, and we have environmental organic acid around the 750.

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DR. PARK: So again, the features we identified, you know, out of those features, we narrowed down our question to the -- we directly ask it's a simple question. So what else -- what else chemicals this hyperthyroid of the cats got exposed? Did it get exposed higher than the normal cat? That was our question?

So we choose features from hyperthyroid cat. You

know, they showed the higher intensity than the normal cat, so it could be more than two-fold and also have -- the difference should be significant. So when they identify the features, we didn't consider less than 80 a matching score.

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DR. PARK: So this is our preliminary result. So it listed as the highest score -- highest score to the low score. And our first chemical duloxetine. This is antidepressant. And I'm seeing the PFAS too, pesticide pharmaceutical, paint ingredients, and some fragrance, and also the -- some flea control, and some personal care product chemicals too.

You know, the -- a publication published by the Schymanski, ES&T 2014, she classified competence levels for identification. So when we have a reference standard, authentic standard, it falls into the highest level 1. But if you have only exact mass information, it's lowest level or level 5.

If you have further information like isotope and the publication -- some fragmentation information, you can raise your level to the -- from 5 to 2, 3, 4. So based on this classification, we are classified our level of confidence. The first chemicals we have with highest score, duloxetine, it falls level 3, and PFAS, yes we have

a standard that's in level 1, and the rest of chemicals we identify fall into level 3 to 4. So this means that the features we identified may not be the chemicals that we think it is. I just want you to keep in mind.

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DR. PARK: I stick in this slide, because I like it. You know, I also like to show a good example of what I meant by early warning system. So we happened to identify F-53B. This is known as a replacement PFAS. More accurately this is replacement of PFOS. So if you see the structure, you know, the 6 carbon fully occupied by the fluorine, and connected by ether link, means that it's breakable by any enzyme activity in your body. It can form 6 PFAS.

Although, this compound was detected in only one hyperthyroid cat, from now on we're going to keep our eye on it in every sample. That's what I meant about the early warning system.

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DR. PARK: So what about the rest of 80 percent features, we couldn't identify using our database?

I don't want to -- you have to go by the -- some -- the whatever information available out there like on-line database, you know, together with your fragmentation information, isotope information. But I

don't want to spend too much time on this one. Just one slide enough for me, because this is not what we are currently focusing on due to the limited resources.

But I'd like to share some workflow -- very basic in the early stage -- workflow to show the complexity and limitation of this type of work. So let's say the 1,000 features were not identified, and you picked the one feature with certain mass. You know, the -- using this method, you ask to generate the formula. It give you the -- it gave us 18 formulas with the -- in the order of score.

So first 3 -- your left side is the isotope information. The most probably -- isotope information, we use the chlorine as a filter, so it will display anything -- you know, the possible combination with chlorine.

So, you know, the first 3, we used on-line database. We just swing by the on-line database like ChemSpider. First 3 didn't hit any, you know, 0 hit, 1 hit, 0 hit. So we eliminate those 3 -- top 3 scores. And next to these 2, we eliminate them because it has 3 chlorine, but we see the isotope distribution. We are familiar with the chlorine isotope distribution. It's a typical isotopic pattern for the 2 chlorine.

And the rest of 12 more formulas were eliminated

due to the lower score. So we picked C14 H10 Cl2 with a monoisotopic mass of 339. We entered in ChemSpider. It came back with 352 hits. This is kind of average case you're going to run into when you swing by the on-line database system, and the chemical they give you as a number one hit is that these chemicals -- but so far, I did all the Google search, couldn't find any information yet.

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DR. PARK: So next step for this project, we will continue to identify the features, also to continue through the confirmatory activity to raise our confidence level 1 or 2. So ultimate goal is to select, out of these identified features, like 5 to 10 compounds of concern to designate for biomonitoring. Of course, we always work with our colleagues in OEHHA as usual.

And we need -- and then also you select target compound. We're going to develop the method for the quantitation, as you know, as you use your -- and, of course, we have to finish the SOP to apply to the human studies, like 3 studies I'm going to introduce you next 3 slides.

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DR. PARK: So we are participating in the U.S. EPA Round Robin study. U.S. EPA prepare some samples

based on their ToxCast library chemical list. And we'll distribute to us samples many different labs, because they're using different techniques.

We belong to Lab C, because we're using LC time of flight. You know, maybe Dr. She's group maybe belong to the Lab B, because they have orbit trap. And I, to my understanding, Lab A has GC time of flight like Oliver Fiehn. So U.S. EPA will compile all the results to find some common ground. We expect this sample arrive very soon.

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DR. PARK: So second project, we are collaborating with the UCSF, UC San Francisco, is we recently received 5-year grant from NIH. Ultimate goal for this study basically same as the cat study. We want to discover some normal environmental contaminants in human body. So our role is to develop QTOF screening method. The -- and the -- so build environmental organic acid detected in the human body.

So this is so far the composition of library, you know, the monitored chemicals, other pesticide metabolites and the phenols. PFAS, we have phthalate metabolites. I'm seeing the -- some PCB, PBDE metabolites too.

And then again, the same concept, you know, the -- also, you have 10 priority environmental organic

acid. You develop the target method to confirm and quantify them. So our collaborators who we do assessment for the exposure to these 10 priority environmental organic acid.

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DR. PARK: Our last project collaborate with Uppsala University -- I'm almost done -- is a metabolomic. Dr. Samira Salihovic who's sitting over there, she's done sample analysis the last month. You know, she analyzed 325 subsamples out of teacher -- California teacher population. So we're going to look into the -- some variation in the metabolomic profile against the POP exposure. You know, the -- you know, we already have POP data.

And then we're going to compare the senior group for California teachers and the Uppsala senior population focusing on the -- around the 87 -- around the 80/70. So she using the primary database for the peak identification. She using library built between Uppsala University and the Colorado State University. Also, she will using -- she'll be using secondary database, like on-line database like METLIN.

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DR. PARK: So as you see, this is definitely a team effort, of course, of this project being led by

non-target analysis team sitting over there, our ladies. You know, the Dr. Miaomiao Wang is team leader, and Dr. Swati Anand, and Dr. Samira Salihovic, they are working on their own project right now.

Also, the -- I appreciate all my colleagues for their continued support and help here and there. And my branch also, Dr. Petreas' Branch, you know, the -- we are a great team. And Dr. Steve Garner, I really give -- want to give a special thanks to him, because -- his help in Albany Animal Hospital. He organized all the sample collection and also collect the samples. So if you have a pet, use his hospital.

(Laughter.)

DR. PARK: Sorry, just kidding.

Of course, our CDC grant always helpful appropriate resource.

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DR. PARK: So that's it. Really ready to listen to your expertise. We are just beginning of the program. So we want to grow more. So one thing, you know, the -- I remember -- I believe that's Dr. Oliver Fiehn class, he said there are known -- you know, the identification process, he said, you know, it takes a 1 graduate student for 1 year to identify 1 compound. Now, I understand better, yeah.

(Laughter.)

DR. PARK: Thank you very much.

CHAIRPERSON BRADMAN: So we have 5 minutes for Panel questions and comments.

Dr. Fiehn.

PANEL MEMBER FIEHN: Thank you. Very interesting. And I think it's also a part of the future to look broadly. And I think you have nicely shown that you find things that you already know. But in addition, maybe new, exciting findings in the cats at least.

Now, obviously, when you extract blood plasma with methanol, you will get a lot of endogenous lipids at very high concentrations, which make most likely the majority of all those features that you see.

Have you thought about filtering the data set just based on isotope pattern? Like you showed for the chlorines, if you have 2 or more chlorinated compounds, then you nicely can see the isotopic patterns. Can you just filter the data set on that?

DR. PARK: I think I have to defer to the -- our expert.

PANEL MEMBER FIEHN: The question was that you showed spectra for chlorinated compounds, and the question is could you just filter all your data based on that kind of pattern, so that you only look at chlorinated, for

example, and not get disturbed by all the lipids and so on?

DR. WANG: Yes, the method we use is in the molecular formula generated step. You can just force the chlorine to be at least 1. So by forcing to be at least 1, you basically bring the scores of the features that has like higher scores, so that they would like -- you can list all the features according to the scores, and the top scores would have like chlorine features.

And so we look at the features by first their scores and also by intensity. So you want to pick those with the proper chlorine feature and also with like high intensity ones.

Miaomiao Wang from DTSC.

DR. SHE: Yes. And what Miaomiao said, I think chlorine is very typical for the M plus 2 elements. So you can use repetitive search or recursive search, a sure M, and then you definitely can go through your database, ferret it out. That's what I'm -- also, chlorine have a feature called mass deficiencies. Combined with mass deficiencies feature you may easily identify which compound with chlorine.

DR. WANG: Yes, yes.

CHAIRPERSON BRADMAN: Dr. Quintana.

PANEL MEMBER QUINTANA: I have a question

about -- I guess framed through the lens of what a great job the California Biomonitoring community has done in giving results to participants, one of the issues of doing non-targeted analysis is you now have the ability to see maybe too many things, including drugs of abuse, for example.

So I would just -- especially, if we're trying to take biomonitoring to communities, one of the biggest concerns community members have is misuse of the samples, in the sense of detecting drugs of abuse, or something that could put them at risk in their minds, you know, for either censure or, you know, losing child custody, or something like that.

And so I'm wondering if we're thinking about how we frame the consent, or how we even have explicit rules for -- and analytical approaches that make people feel very secure that looking at those things would not be known.

Even in the cats, one thing that came up was the antidepressant, which may be -- the owner might not want people to know they -- you know, it would be in the house or something like that. So it's -- it's just something that I think we should be proactive. And I think the staff is excellent at being proactive in this area.

And it came up for us doing non-targeted analysis

of house dust samples, where we saw it from a low income population, where we saw many, many different drugs of abuse through doing non-targeted analysis, and that, you know, was fortunately covered by our consent form, but it was -- you know, it's an issue for communities, I think.

DR. WU: I'd like to comment on that. This is certainly an issue that's come for other groups dealing with non-targeted analysis, not only drugs abuse -- drugs of abuse, but also medical conditions that might be revealed through this sort of testing.

This -- we're not -- we have not done any of this non-targeted screening on population base. We're not quite there yet, but it's something we're thinking about in our informed consent in terms of very explicitly calling out what drugs will not be covered. And we always include language about how the results are private. They're only for you. They're not revealed to your doctor or to your employer. And it's language we will continue to work on, as this kind of work gets closer for public use.

MS. HOOVER: And I'll -- this is Sara Hoover. I'll add just one other side note on this. This came up with Jianwen's choice of benzophenones, we'll be talking about the class of benzophenones. So our other constraint with non-targeted is that it actually has to be listed as

a class, you know, designated chemical.

So if we were going to undertake an analysis like this, in an actual Biomonitoring California study, and I think both Jianwen and June-Soo alluded to this, we have to actually deal with the fact of identifying it officially as something that we can look for in samples. So that's another step.

PANEL MEMBER QUINTANA: But just to clarify my point, if some -- if making sure the data itself is secure, because somebody, if they got access to the data, even though your scientists did not look for compounds, because it was not a class, they could find them. So I think you just assure the issues --

MS. HOOVER: No, I understand. I was making a side point. So I was going -- going further, but I think, you know, Dr. Wu had addressed that. And certainly data security and confidentiality is a huge priority for the program.

DR. SHE: Also, I'd like to add a point on -- that's a very good question, we -- a lot of the unknown area to do unknown chemicals analysis -- we need to explore it. But from a technical point, mass spectrometer software allow you have inclusive list and exclusive list, so which we are for sure something -- we concern with drugs, we can put them in exclusive list, so that make

sure we don't identify them.

And also on the data acquisition part, even further to data in computation, we can exclude them. On the data acquisition, we also can use certain technology. I don't know, like we talk about the data-dependent acquisition, make sure some concerned chemical will not be acquired. And beyond, we archive data, you know, a safe way. That's my comment.

MS. HOOVER: Okay.

CHAIRPERSON BRADMAN: So I'm going to interrupt here. We're still on time, but we also incorporated some time for public comment in this period. So why don't we go there, and then we'll have until 12:30 for more discussion.

Are there any public comments related to this topic?

Anything from --

MS. DUNN: We don't have any in the room or on the Internet currently.

CHAIRPERSON BRADMAN: All right. Well, just a reminder, if you do have input on this, if there's -- there's more time until 12:30. And then, of course, in the afternoon, we have open comment on anything related to today's discussion.

So why don't we continue that discussion. I

think this issue around consent is very interesting. I know with regard to our studies, in Salinas and elsewhere, we specify in our consents that we'll measure environmental chemicals, and that we've never targeted, you know, anything unrelated to an environmental chemical. Environmental being sort of exogenous, non-pharmaceutical, you know, non-drug substance.

We do often get -- as part of our consent, we get approval for future testing of environmental chemicals. And one thing to consider, as we move on, is how to return results when we think about non-targeted, or how to frame the consent related to that. And it may be, at some point, for some of these samples, they can be totally de-identified.

You know, for returning results, of course, you need some personal identifying information for contact and outreach. But maybe we need to incorporate a concept in here where we have ultimately all the demographic and other information, geographic information, but if they're permanently de-identified, that might allow other kinds of investigations of environmental chemicals.

And if incidentally we pick up some things that were not -- you know, not within our framework of looking at environmental chemicals, that can be essentially ignored or -- I mean, that's in a whole other discussion,

but at least there's not a risk of an individual being compromised by a hack or some other breach of information.

DR. PARK: That's why the -- I'm sorry. I emphasized, you know, the ultimate goal for the cat study also the -- one of our -- the human biomonitoring study. You know, also you have a list of chemicals you are concerning. We try to prioritize them, put it in our target analysis basically, you know, the same as all the -- all our designated chemicals we are analyzing for the -- like POPs, PCB.

You know, we can -- we can secure the data in that way. You know, I agree with you, I don't see any other way around to have this data packet together with your return -- you know, I'm always kind of sensitive to any community-based study, because I know how much they panic when they see some numbers they don't understand. Also, that they can -- they sometimes use, you know, the -- sometimes misuse it without proper background and education.

So that's -- that's why I'm saying my point is I totally agree with you and Dr. Quintana, yeah.

CHAIRPERSON BRADMAN: Can I make -- and extend that a little bit. I mean, we do have some history with somewhat related work around genetics and genome-wide studies, and also even with epigenetics where it raises

issues of report back.

It seems to me that in a way us dealing with these issues really put us at the forefront of a key, you know -- ethical issues in environmental health research. And maybe this is something that should be raised also more broadly. I mean, there could be a recommendation from the Program or this Panel that there be a National Academy of Science Committee that really explores this issue.

There was a report, you know, they did years ago about the implications of environmental health research and testing in homes and housing. In fact, there's a paper in EHP this week on ethical and legal obligations around doing studies and measuring contaminants in people's homes.

I think maybe there could be some sort of formal assessment that could both guide the California Biomonitoring Program, but also other biomonitoring elsewhere. I'm sure other people are thinking about this.

DR. SHE: I have concept clarification here. So untargeted, or semi-targeted, analysis provide result -- is qualitative. Targeted analysis, or we called master method to provide results -- quantitative. So the -- this is difference. So the domain of these 2 different approach, I do not think untargeted analysis result can be

returned to the patient.

Like June-Soo mentioned, you know, his -- in talk, these qualitative results will go through quantitative targeted analysis to refine and tune-up. So I like the approach. You mentioned that we de-identify sample to help the qualitative analysis. Once we study -- because untargeted analysis have no standard inside, so that's low quantitative information. We can estimate. Yeah, that's my --

MS. HOOVER: Sorry. I just had to throw in there and stop Jianwen at that point, because actually we can return -- you know, if it's just to detect, it doesn't have to be quantified. So our results return is any results.

So we are in a bit of a -- I think this is a great suggestion. I think it's a very important topic. And we have to get with our, you know, results return specialists, and more broadly how would we address this, including the confidentiality issues.

And I don't think, you know, given the nature of our law and our mandate, we can't like permanently de-identify and then use those samples. If we've taken samples under our mandate of, if you want your results, you get them. Then any finalized result our ethic is we return it. So that's the situation we're in for the

Program.

DR. SANDY: Hi.

CHAIRPERSON BRADMAN: Dr. Quintana. Oh, okay.

DR. SANDY: I'm Martha Sandy. I have -- have a new question for June-Soo, I think. Sorry. So the start of this discussion, I think, is -- the concern was when you measured some of the compounds that were identified in the -- in your library as possibly being pharmaceuticals in cat blood.

Acetaminophen, for example, I'm just wondering -- and then you had a ranking of the certainty. That's not the right term, but you had category 1, 2, 3, 4. And I don't believe it was in -- I think it was in 4. So my question for you is, have you -- based on that program, do you feel confident that you identified acetaminophen or is there not confidence? And perhaps when you don't have confidence in something, you wouldn't even consider?

DR. PARK: That's the kind of whole issue we've been discussing about. You know, the -- when you say -- when you say a confidence, you know, we are only confident -- you know, that's what they classify the -- I like it. You know, they classified 1, 2, 3, 4, 5. We are only confident as to what the level says. You know, we have isotope information. If you have some fragmentation information, also if you have some publication, talk about

the chemicals, show -- you know, the -- provide a lot of information about it, then we are as confident as what we have, based on the information.

So if you say, hey, are you 100 percent sure that's what -- that that's the what you said what it is? I don't think so. I don't think so. That's why the -- we want to circle back. Once you have something you are interested in, we want to circle back and take it as -- use the chemicals.

We probably tried to search for the -- some standard, if we can purchase from the company. If not, probably try to arrange the level as high as possible. That's best thing we can do. Yeah. Did I answer to your question?

DR. SANDY: I think so.

MS. HOOVER: And this is Sara Hoover again. I think I know where Martha was going. And I want to clarify one thing I said, which it's true that there's a certain thing that we call a result. You know, we have a result that's finalized and certified. So the question is, you know, from non-targeted, what would we call a result? You know, would we have a confidence level? I think it's an interesting question. And I know just speaking from someone who's participated in biomonitoring and been biomonitored, I'd still want a result.

You know, I don't need 100 percent confidence. I'd be very interested to know like a non-targeted screen of my blood. So I think that's the ethic, if you sort of put yourself in that position of what would I want to know versus what I -- what is too unclear to convey.

So I think that line we certainly haven't gotten there yet. We haven't run this on any people that we've consented, and -- but I think that's an important pilot to undertake and actually figure out what is the result and how would we return it?

PANEL MEMBER QUINTANA: I just thought of another quick follow-up question. Maybe it's for our legal counsel in the back there, but -- so when we're doing studies -- research studies at a university, and there's potential that the data would be compromising the subject, then you can apply for a certificate of confidentiality, where it cannot -- could not be subpoenaed, for example.

But I'm just curious if this data is -- is it subpoenable? I mean, it just -- it's a question, because even a qualitative finding of methamphetamine in the blood might be of interest to someone in a child custody battle. You know, so I'm just curious about that protection. I know it's not quite the same as what I've dealt with.

STAFF COUNSEL KAMMERER: This is Fran Kammerer, staff counsel. That's a really good question. I am not

sure. I'd have to look that up. It would probably depend on the case and the judge, so I can't give you a straight answer for that. I'm sorry.

CHAIRPERSON BRADMAN: I can just comment with a little personal experience. We -- for CHAMACOS, we got a certificate of confidentiality, which, I mean, we think it was an important thing to do. They've never, ever been tested in court. We had one situation where we had a potential child custody issue with a participant in one of our studies, and we were requested to release some of our samples so they could be tested and shown that -- well, in this case, they wanted to show that there was no drugs present. But then the issue was resolved, and we never had to actually confront it directly on, which we were glad. I mean, our feeling was that we could not release those samples.

But, you know, there's always a potential for that to come up. The other piece where we've been concerned, and this should -- you know, when you deal with illegal drugs and things like that, what would raise to the level of child abuse? And if, for example, you did an untargeted analysis and identified, you know, a dangerous material that's -- that the child is being exposed to, like an illegal drug, as researchers we're obligated to be mandatory reporters, you know, would that raise to the

level of neglect or child abuse or something like that? And those would be all things to think about very closely before you start testing samples.

DR. WU: I wanted to comment on what Sara had said earlier before we got to this issue of revealing confidential information, which is that maybe the banked samples, for example, the GDSP MAMAS samples that we've used for other studies, maybe this would be a good match for a population based non-targeted screening. Those are not subject to results return, because we don't have the identifiers on them.

And while we wouldn't be able to look for specific exposure, we would get a population -- an idea of exposure across the population.

MS. HOOVER: I just also wanted to add that we will definitely follow up. We don't have the answer, you know, in terms of our particular data. And I think it's an excellent question. We will follow up and look into specifically what our data would be subject to, the data we collect.

DR. SHE: One more comment. I think that's a very good question. I compare this unknown analysis with the forensic analysis. So the data must be cross-validated, supported with other documentation, if legal issue come. That's my look at the forensic

analysis, the lens, to check the unknown analysis. So we provide some fingerprint.

STAFF COUNSEL KAMMERER: This is Fran Kammerer. I just want to add one thing to what Dr. Bradman said. He is reassuring, and I agree with him, most courts are -- they hesitate about disclosing personal information. And that's the kind of thing that would be taken in chamber and maintained confidential to the -- you know, to every extent that they can, but -- and they try to respect certificates, or anything that will show any kind of degree of confidentiality. But other than that, it's usually in a criminal case and it's up to the judge.

CHAIRPERSON BRADMAN: All right. We have about 7 more minutes to be on time. So, Dr. Fiehn.

PANEL MEMBER FIEHN: Yeah. I would definitely favor, if we would have maybe a special session on these ethical issues, clearly inviting people who have thought about the ethical issues and genomics and SNP genotyping. I am sure they have all thought about it very thoroughly over the last 10 years, where we can borrow ideas and information.

Secondly, of course, we should not forget that, you know, we have to distinguish here between OEHHA-sponsored or -initiated studies, where data have to be given back from other studies that people conduct.

There are 300 studies on-line, including many, many studies done in humans in untargeted metabolomics, where people could, in principle, go in and screen for -- you know, take the raw data and do their fantastic data processing tools to find exposome type of compounds, pharmaceuticals, illicit drugs and others.

So this is going on. People do this. But this is different from the mandate that we have here. So these studies are going on. And all those public data cannot be identified to specific people. They are all de-identified. They're all very broadly classified, if at all. So you would never have the opportunity to go and even go to a certain region or a certain neighborhood, I would say, right, for these data that are already public.

And this is clearly mandated, for example, by the NIH, because the NIH spends $35 billion on research, and they want the data to be public. And I think this is a good move to say data should not be behind screens. They should be public, but, of course, protecting the public as well.

MS. HOOVER: I'll just follow up -- 2 things just to clarify. The thing that I was talking about results return is Biomonitoring California, not just OEHHA.

PANEL MEMBER FIEHN: Oh, okay.

MS. HOOVER: Yeah, so that's our whole Program's

ethic. And that, yes, we do actually make summary data public already. So that's part of our ethic, too, is that we have our individual results that are always kept 100 percent confidential, but that we do find a way to do summary data presentations. So this isn't -- that would be another angle on this. But I thought Nerissa's flag about the kinds of samples we can use to start non-targeted work was a really important point, and that's something we could pursue.

And I would suggest actually that we add 5 minutes to our lunch and go ahead and -- unless anybody has any last comments?

CHAIRPERSON BRADMAN: That sounds good.

(Laughter.)

MS. HOOVER: So before you break, I'm going to hand the phone -- microphone back to Fran who will do your reminder. And then, Asa, you can do the other notes in there, too.

STAFF COUNSEL KAMMERER: Just reminding you not to talk about subject matter of the Committee at your lunch, and keep that for the public environment here.

Thank you.

MS. HOOVER: You don't have your -- there's other notes for you.

CHAIRPERSON BRADMAN: Yeah. No, no, no. I got

it.

MS. HOOVER: Okay.

CHAIRPERSON BRADMAN: Just as a reminder, we have an hour and 10 minutes, maybe a few minutes longer for lunch. And we'll start the meeting again promptly at 1:45 p.m. So if you could be back by 1:40, so we can reconvene on time.

There's the CDPH cafeteria just outside the auditorium. That's probably he best place to go in terms of time to get back here on time, which is crucial, and essential.

(Laughter.)

CHAIRPERSON BRADMAN: Thank you.

(Off record: 12:27 p.m.)

(Thereupon a lunch break was taken.)

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

(On record: 1:45 p.m.)

CHAIRPERSON BRADMAN: So it's -- actually, we have less than a minute. We're exactly at the time to start the meeting. I want to welcome everyone back from lunch, and officially call the meeting back to order. And I also want to introduce Dr. Myrto Petreas, Chief of the Environmental Chemistry Branch of DTSC, who's going to be introducing, I think, a dear colleague of all of ours, Dr. Peggy Reynolds.

So thank you, Dr. Petreas.

DR. PETREAS: Thank you. Welcome back from lunch. It's a great pleasure to have Dr. Reynolds with us today. She and I have been working together for over 20 years, combined expertise in epidemiology and persistent organic pollutants, or POPs, have had many great ideas and some of them even got funded. And I counted 5 grants altogether.

So our latest study involves measuring POPs in a subset of the California Teachers Study. And periodically I give you updates on where we stand with that study. We're very happy that Dr. Reynolds and the steering committee of the Teachers Study have agreed to share data.

And now our website where we have our database with the results -- we have aggregate data for over 2,000

women. This is the largest cohort of California data set on POPs -- contemporary POPs.

So to give you just a brief description of her distinguished career. She's currently a senior research scientist at the Cancer Prevention Institute of California. She's also consulting professor in the Department of Health Research and Policy in Stanford Medical School, and a member of the Stanford Cancer Institute.

She was appointed to the Carcinogen Identification Committee for Proposition 65 by Governor Brown in 2012. Dr. Reynolds has spent several years as an epidemiologist for the California Department of Public Health in this building. First, for the San Francisco Bay Area Surveillance, Epidemiology, and End Results Program and later as Chief of the Environmental Epidemiology Section in the Environmental Health Investigations Branch.

She has conducted many epidemiology studies of breast cancer and cancers in children. And today, she will provide an overview of the California Teachers Study, including some new findings from our substudy.

So with that, welcome.

(Thereupon an overhead presentation was presented as follows.)

DR. REYNOLDS: Thank you. So my -- can you hear

me?

I'm okay.

Well, thank you. Actually, looking around, it's actually nice. There's so many people I know here and have known for awhile. So thank you for the opportunity to talk a little bit about the California Teachers Study, and in particular a collaboration that we're very happy to have had an opportunity to have with Biomonitoring California.

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DR. REYNOLDS: I would like to sort of structure this to talk about several things. First, give just a little bit of background about the California Teachers Study. I know you've heard about it from Myrto over time, but I'll give you just a little backdrop. Then talk about the study of interest here, which is the CTS study of persistent organic pollutants, or POPs, a little quick update and some recent results that you may find to be of interest.

And then I wanted to just mention a couple of ancillary studies that have subsequently been funded built on this POPs study that I think you also find of interest.

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DR. REYNOLDS: So the California Teachers Study was initially funded with breast cancer tobacco tax

dollars. This was a one-time allocation to the California Department of Public Health, formally known as the California Department of Health Services to the Cancer Registry. And it consisted of a collaboration of epidemiologists from the various regional registries, deciding that the best investment for this one-time allocation was actually to construct a cohort study that would be California-specific, that would be basically designed to really directly address risk factors for breast cancer, and a broad spectrum of potential risk factors for breast cancer in women in California.

So we recruited women by inviting every woman that was enrolled in the California State Teachers' Retirement System in 1995, both active and retired teachers, and school administrators. We ended up with a cohort of 133,479 women who agreed to participate in this prospective study.

So what we have in California is a statewide study that is very geographically diverse. It is, in fact, the largest prospective study that was specifically designed to study breast cancer. And now with over 20 years of follow-up, we're finding that it truly is a valuable source of information on women's health above and beyond breast cancer.

In the 20 years since we had that one-time

allocation from the tobacco tax dollars, the infrastructure for teachers has actually been funded by the National Cancer Institute as one of their cohort studies.

So I just wanted to show you a pin map that is the distribution of participants in this study at baseline when they entered the cohort in 1995-1996. And what you can see is the distribution is pretty much the distribution of a population of California. So we have a focus of teachers in the urban areas, the Bay Area, Los Angeles, and south coast. And we have teachers also distributed throughout the State in both urban and rural environments.

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DR. REYNOLDS: So as part of the study, we have, over the years, been engaged in a number of activities. For one thing, we've done active follow up in a variety of ways, one of which is the -- a series of questionnaires. After that baseline questionnaire, we asked another 4 questionnaires, and actually we're currently in the process of putting together a sixth questionnaire for follow up and to ask questions about perhaps new and emerging questions in cancer epidemiology.

And because this is a California-based cohort, we are able to do passive follow-up pretty efficiently,

effectively, and thoroughly by linking the cohort annually to the California Cancer Registry, which covers the State for all newly diagnosed cancers, to hospital discharge data, statewide, and to State and national death files.

So into 2015 to date, we have over 20,000 cases of cancer that have been diagnosed in cohort members of all sites combined. The most common site, of course, is breast cancer. We have over 7,000 cases of in breast -- of invasive breast cancer that have been diagnosed, and 1,600 or so cases of in situ breast cancer.

To date, there are almost 27,000 deaths among women in the cohort. We have detailed information on cause of death through 2013, at which time we had over 7,000 cancer deaths and a little over 1,300, close to 1,400, deaths due to breast cancer.

In addition, even though we weren't able to collect biospecimens at baseline for all 133,479 women, as we would have loved to, we have over time been building a biobank that is a resource for additional studies. And we have now over 20,000 specimens in the biobank, consisting primarily of blood samples, but we also have urine samples, toe nails, and saliva. So we have a variety of biospecimens, predominantly blood specimens.

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DR. REYNOLDS: So just to give you a quick

overview. And I'm not going to go through this in great detail. I know you all have the slides and the slides are on-line. I wanted to emphasize that this has been a multi-institutional effort since day 1. Our organization has really focused on interest in social and environmental factors for cancer, and also nutrition and diet.

The City of Hope, which is currently the coordinating center for the study, has focused a lot -- our investigators there have been very interested in particularly hormonal carcinogenesis. Leslie Bernstein, as many of you know, is one of the world's experts on physical activity. Has done a great deal of work in this cohort on that, and genetics, and biologic mechanisms, and really innovative methods of data management.

Our colleagues at UC Irvine focused on genetics, and as you will see, has a variety interests, one of which I'm going to talk about a little later, which is mammographic density.

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DR. REYNOLDS: So I'm not going to go through this whole list, but I wanted to give you an idea of some of the ancillary grants that have been funded for the Teachers Study above and beyond infrastructure, covering a variety of kinds of risk factors for breast cancer, for other cancers, and even other health outcomes with

colleagues in the State Health Department, and OEHHA. We've been doing work on air pollution and cardiopulmonary mortality.

And the 3 that I've highlighted there are those that are actually specifically relevant to the POPs study, which is really the topic of today.

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DR. REYNOLDS: So if you want more information on the Teachers Study, all of our questionnaires are on-line, all of our newsletters are on-line, and there are other little tidbits about Teachers Study on our website, so please feel free to visit www.calteachersstudy.org for more information.

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DR. REYNOLDS: So the study of interest today really is our study of persistent organic pollutants in breast cancer. This is a study that was funded in 2010 by the California Breast Cancer Research Program as part of its strategic research initiatives. Our specific aims were really to -- initially, we were very focused on PBDEs, to screen for predictors of PBDEs. Really, the primary aim is to assess risk of breast cancer for these families of chemicals, and also to explore windows of susceptibility within those analyses.

So the chemicals of interest were chosen because

they are endocrine disrupting and extremely persistent, both in the environment and in people. Those we called "the old" are a series of legacy chemicals, PCBs, and a number of organochlorine pesticides, and "the new", at the time -- although some of these have now been discontinued -- were really -- was our focus on what, at the time, appeared to be a particularly provocative topic, that of the polybrominated diphenyl ethers, the PBDEs. And as the study began, we originally had hoped to look at some of the replacement BFRs, but there were some laboratory constraints. And our collaborators with Biomonitoring California offered to add into the mix the per- and poly-, per- and polyfluoroalkyl substances, PFASs, as we now call them. It was so much easier when they were "PFCs" to pronounce, but there you go.

(Laughter.)

DR. REYNOLDS: Now, they're PFASs. I have to keep up with the terminology with my colleagues.

So this has been an ongoing collaboration with the environmental chemistry laboratory with Myrto and June-Soo and other colleagues in the lab.

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DR. REYNOLDS: So the status of the assays right now is that we do have assays completed for 19 congeners of PBDEs, for 12 of the PFAS. And we will soon have --

the assays have been completed, and we Will soon have in hand this very month the completed assays for 15 congeners of PCBs and 7 pesticides. And we're looking forward to getting that final data set.

Because of this, we haven't yet really had an opportunity to begin an analysis of breast cancer risk. We have been waiting for completion of the assays.

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DR. REYNOLDS: But meanwhile, we've had other things to do and other things to talk about. I will share a couple of those things with you. I did want to show you this map. This is actually a pin map that is the location of the participants in the POPs study. And as you can see, the general distribution of participants in this study is very similar to that for the cohort as a whole, and again, focuses on some of the urban areas, but we also have participants in other more rural areas of the state.

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DR. REYNOLDS: This has been an aging cohort. And so currently, for the participants in this study, and because it was designed as a breast cancer case-control study, so that the controls were age-matched to the cases, the mean age of participants currently is 67 years with still a fairly wide range, 40 to 94 years. And it is -- the cohort is predominantly non-Hispanic white. Although,

as part of our POPs study, we did try to over -- do some oversampling of women of color so we could talk a little bit about them.

But this does pretty much represent a largely, not quite elderly -- I don't want to call 67 years elderly, an older predominantly non-Hispanic white cohort of women that is very representative of the distribution of women in California. So while waiting for final data to come through, so we can start our risk analyses, we've had an opportunity to look at a number of things.

I think Myrto has talked with you all before about a study we did looking at PBDE levels for women living near waste sites. This is the relatively hot-off-the-press publication from Environmental Science and Technology Letters that was of sufficient interest that we made the cover. So I did want to share the cover with you.

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DR. REYNOLDS: And in this study, we were able to access data from the U.S. EPA measurements of chemicals in public water systems. This is an unregulated chemicals monitoring report, so not regulated chemicals. And it is available for all public water systems serving more than 10,000 people, and then 800 representative public water systems serving 10,000 or fewer people.

And in this latest round of the UCMR3, they included some information on some of the PFAS.

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DR. REYNOLDS: So what we did is we took a look at women that we had in our POPs breast cancer study, and included data that we had on blood samples collected from January 2011 through September 2013. The lab analyzed them for 12 PFAS. We address geocoded all of the residences where women lived at the time of blood draw, and we ended up with 1,333 participants who lived in a zip code with UCMR3 data on PFAS in the water.

And this 1,333 participants is roughly 40 percent cases, and 60 percent controls.

We then matched them by residential zip codes to the drinking water systems tested for those chemicals

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DR. REYNOLDS: So these are the 12 PFASs that are measured by the lab. In general, the detection frequencies for most are quite high and body burdens similar to what we see in NHANES data.

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DR. REYNOLDS: The PFAS in water measured about half of these compounds. And so we restricted our analysis only to those. And as you can see, of those, there are really only 4 where they actually had detectable

levels in the UCMR3 data.

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DR. REYNOLDS: So the results were that we found that all of the PFAS levels in -- were below the previous U.S. EPA health advisories, which as you can see were fairly high, 400 nanograms per liter for PFOA, 200 nanograms per liter for PFOS. Those are the only 2 for which there was a health advisory. And this was changed in May of this year to the rather strikingly lower advisory level of 70 nanograms per liter for PFOA and PFOS combined. In our data set, 40 percent of the women -- 40 percent of the PWSs of the water systems exceeded this new EPA health advisory level.

And the results really are that women with PFAS detected in their water, that is any detection, not necessarily the level of detection, had 38 percent higher PFOA and 29 percent higher PFOS levels in their blood, which surprised us, because --

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DR. REYNOLDS: -- there are a lot of limitations to this study. So this is just giving you these data in bar chart format. You can see these are significant differences for PFOS and PFOA between women living in zip codes with detect -- in zip codes with detected versus non-detected, these analytes, and we didn't see any

association further. Much were rarely detected, the other 2 compounds.

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DR. REYNOLDS: So this was something our laboratory colleagues really pushed to do. It was their idea, because this is a -- it's a topic of current public policy interest, and there was a nice opportunity, and a very large data set to do this. But there were a number of study limitations to what we were able to do in this quick analysis.

First of all, the method detection limits of the UCMR3 data are still -- are relatively high. And so the likelihood is good that PFAS could be underreported in the water systems. Only 109 of our 1,333 study participants lived in a residence in a zip code that was supplied by a public water system that had detected at least one PFAS.

Some zip codes, of course -- zip code isn't necessarily the optimal level of analysis. It's -- they are sometimes geographically large and heterogeneous, and some zip codes encompass more than one public water system.

And, in fact, the study was not designed to actually test the effect of drinking water. We had to assume ingestion of home tap water, but we didn't actually have data on that. This was simply a matter of living in

a zip code where there was a detection of one of these analytes, and those women had higher body burden levels of the 2 -- of the 2 compounds of interest.

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DR. REYNOLDS: So despite that, there are some study strengths here. First of all, the distribution of the age, race, ethnicity, and disease status in the study sample were similar across the categories of PFAS water detections.

The majority of these women -- this is an aging cohort. People are a little more residentially stable with age. And 70 percent of the women lived in the same address for over 15 years. This is a single occupational group, so we aren't necessarily looking at a highly exposed occupation or mix of occupations. And we actually redid the analysis looking only at the controls and got the equivalent results.

So, in conclusion, this was the first -- oh, I only have 10 minutes left.

It's the first study to demonstrate an association between levels of these chemicals in serum and their presence in drinking water supplies, notably in a population with no previously recognized water contamination, and to our knowledge this is still the only sort of general population study addressing this issue.

And so our findings are really in agreement with other studies that point to the need to reduce PFAS in drinking water. I just want to emphasize the associations are probably underestimated here.

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DR. REYNOLDS: Another topic is whether or not these chemicals -- the levels of these chemicals are changing in the population over time. This is something we have just begun to look at. You have heard, I'm sure, across time, a number of reports from Myrto and colleagues about studies that have been done in Biomonitoring California, suggesting some declines in the PBDEs.

And so we did a preliminary assessment in the CTS POPs study. We only looked at the controls for the most commonly detected compounds for the PBDEs. And that's 3 PBDEs and 8 PFASs. And I just want to quickly show you the pictures.

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DR. REYNOLDS: For the PBDEs, there is actually no evidence to suggest a decline over the 5-year period of this study for data collection.

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DR. REYNOLDS: For the PFAS, these are fairly level. And there may be some indication of some declines for some of the compounds that you can see. It's not

necessarily uniform.

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DR. REYNOLDS: This is something we are now investigating further, not only because of the question itself, but because it's something we need to evaluate as we move into our risk analysis to see whether we need to account for secular trends in the data.

So this has been a nice collaboration between our group at CPIC, the DTSC Environmental Chemistry Lab, and colleagues in the Teachers Study at City of Hope and UC Irvine.

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DR. REYNOLDS: So there are 2 studies that were funded ancillary to the POPs study that I think might be of particular interest to you. There are a number of studies, one of which you heard a little bit about this morning, the interesting metabolomics TOF mass spec work of Samira.

But I wanted to just introduce you to 2 studies, one is one looking at persistent organic pollutants in mammographic density done by a colleague of ours at USC, and second one, which is a new study, looking at the menopausal transition as a window of susceptibility for breast cancer.

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DR. REYNOLDS: So we pretty much know that mammographic density is associated with elevated risk of breast cancer. Eunjung Lee, who is a member of our steering committee got a CBCRP idea award funded to take a look at whether or not the POPs levels in women in this study are positively associated with higher mammographic density.

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DR. REYNOLDS: So building on the POPs study, she is -- which at the time had about 1,300 women without breast cancer, and detections of several of these analytes, she is doing a cross-sectional study where she is recruiting 160 postmenopausal women in the CTS POPs study, surveying them, collecting mammograms to assess mammographic density. And then we'll do the analysis to address the hypothesis right now.

She is -- has recruited 151 participants and the mammograms are currently under review.

So more news to come on that later.

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DR. REYNOLDS: And a new study, that builds very much on the work of the POPs study, is one that was funded by colleagues at City of Hope. This is one that is co-funded by NIEHS and NCI as part of their new iteration of breast cancer in the environment research programs.

The requirements of the projects funded under this initiative is that they are supposed to be transdisciplinary. They are supposed to target specific windows of susceptibility ability for breast cancer risk. They must be designed to integrate experimental models and human studies. This study includes in vitro mouse model and human study elements, and it must include a community outreach component.

The hypotheses of our colleagues is that during the menopausal transition, when natural hormone levels are declining, bisphenol A's and PBDEs acting as endocrine disrupting chemicals promote the development of hormone-responsive breast cancers, they mapped individually or have additive or synergistic effects.

So this study is now introducing another chemical into the mix, above and beyond what we had in our original POPs study, the bisphenol A's. So this is a study in which within the POPs cohort, women ages 40 to 58 years with menopausal status at the time of blood draw are included. Currently, the composition of the study is 150 invasive breast cancers, 97 in situ breast cancers and 416 controls that bridge the perimenopausal period

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DR. REYNOLDS: And the aim for the human study is to assess the effects of these several chemicals in serum

in the menopausal transition on total estrogenic activity, after accounting for endogenous levels, epigenomic changes, including microRNA and global and gene-specific methylation, and ultimately in combination with all of this on risk of breast cancer.

So these are the -- this is the cast of characters included in the new City of Hope BCERP study --

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DR. REYNOLDS: -- primarily at the City of Hope, but it also includes us from the Cancer Prevention Institute, and again, our colleagues from Biomonitoring California and the Environmental Chemistry Laboratory.

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DR. REYNOLDS: This particular study funded NIEHS and NCI, so I hurried along, because you were going to show me 5 minutes in any minute now, so --

(Laughter.)

DR. REYNOLDS: -- I just want to say --

MS. HOOVER: Proceed. Relax. You're fine.

DR. REYNOLDS: -- that regarding the California Teachers Study and Biomonitoring California. So I think it's been a pleasure to have an opportunity to work with Biomonitoring California on this. This is not one of the studies that was initiated by the Biomonitoring Program. But as a collaborative enterprise, we are delighted to be

able to contribute data to general information on levels of some of these chemicals in California women.

And also, the collaboration itself has been extremely rich in terms of helping us think ahead, of other questions, and better ways of asking questions about risk relationships in California.

So the Teachers Study is, as I said, it's statewide. We have extensive information on personal health habits, health histories, and other geographic attributes of where women live and have lived in California. It does reflect the diversity of California environments. There's enormous amount of variability in a number of environmental features that we've looked at in the past.

It is a special demographic. It's women now mostly 60 years or older, but a very large sample size of Baby Boomer women in California largely. This collaborative effort has been valuable, because the parent POPs study was funded by CBCRP and it's really provided a platform for expansion via the inspirations of California Biomonitoring, and other independently funded research projects. It's giving us an opportunity, via this collaboration, to include additional chemicals of concern, and really to address additional health outcomes and biologic mechanisms that may be relevant for exposures to

these chemicals in women.

So I want to just give a special thanks to Biomonitoring California, not only for the involvement in this study, but I've had the good fortune to have been able to work with both laboratories and to work with biomonitoring staff to really help think through how we look at these kinds of issues and the health of women in California.

So with that, I think that is it.

(Applause.)

CHAIRPERSON BRADMAN: Dr. Reynolds, thank you for that presentation. It's really -- it's great to see how both epidemiology and biomonitoring can come together to support really valuable research, both in California and just the field of epidemiology in general.

DR. REYNOLDS: Thank you.

CHAIRPERSON BRADMAN: So we have 10 -- as usual, we have about 10 minutes for Panel questions related to the presentation, opportunity for public comment, and then later on some more discussion, if warranted. So are there are any questions from the Panel about the presentation?

Dr. Schwarzman.

PANEL MEMBER SCHWARZMAN: Thanks so much for that. It's really great to hear about the study. You mentioned that the connection -- the association was

between presence of PFASs in the water and elevated level in -- I don't know if it's, blood or serum?

DR. REYNOLDS: Serum.

PANEL MEMBER SCHWARZMAN: Okay -- in serum of the women living in those zip codes. And so I assume that means that for the various limitations that you discussed, there wasn't a dose-response relationship. That is, you couldn't quantify the levels that were in the water and associated in sort of a dose-response way.

DR. REYNOLDS: We actually didn't attempt to do that as this juncture.

PANEL MEMBER SCHWARZMAN: Okay.

DR. REYNOLDS: And the -- you know, honestly, we were really surprised that it was such a striking finding, given that we didn't have that precision.

PANEL MEMBER SCHWARZMAN: It just made me think a little bit about -- obviously water is a very probable source of exposure, but it made me wonder too if it's potentially a marker, you know, for proximity to contaminated sites and if that exposure may not be exclusively via the water.

Anyway, do you know if there will be -- is there going to be expansion of that investigation?

DR. REYNOLDS: Yeah, we've had a lot of discussion about that. Actually, I have been talking with

some colleagues at the National Cancer Institute who've done a lot of work on water quality and various sources of exposure, not only for these contaminants, but with others who are very interested in partnering with us to do some follow up on that. It was not one of our specific aims for the breast cancer study obviously, but it is really provocative and something that I think we should follow up in greater detail. We haven't had the opportunity to, but I'm hoping, working with NCI, that we will have an opportunity.

And if we do, we'll come back and tell you.

PANEL MEMBER SCHWARZMAN: Great.

CHAIRPERSON BRADMAN: Just another question about possible sources. Are the tests in the water done on source waters or finished water or tap water? And I'm just --

DR. REYNOLDS: Well, it's not what you would have at the tap, so it's at the source, I believe.

CHAIRPERSON BRADMAN: But when we say source, is it already processed water in the facility before it gets distributed or is it before it's gone through its treatment?

DR. REYNOLDS: I think it -- do you want to address that, Myrto or June-Soo?

DR. PETREAS: I'm not sure it's before if it's

ready to be distributed. But the key is that there is -- if -- a water district may have several sources. So UCMR said if it's present in one source, it's called a hit. So again, this is another limitation of this study, because it wasn't represented through the entire volume of water passing through. But if it was one hit one time, within that 3-year period, it was counted. There was only one sample to characterize it.

DR. REYNOLDS: Right. And this -- these are new data, so we -- you know, we're really trying to become more familiar with it. A paper that was published shortly after this one in the same journal by Hu from Harvard, actually was taking a look at the distributions of these analytes through the United States. And what they noted in their paper is that the State -- the number one State with hits was California. So I think California is an important place for us to be further examining this.

CHAIRPERSON BRADMAN: Right, and it seems like the sources of this -- of the materials, is unclear at this point, is that right?

DR. REYNOLDS: It's not -- well, you know I -- I have said often that I've been avoiding trying to do studies about water, because water is really complicated in California. It's the -- the sources can vary in different times of the year. And so just the -- the water

distribution systems aren't necessarily clear geographically. So it's fairly complicated in a way that we do need to try to track down. So this was -- it was really a very crude start, but striking.

CHAIRPERSON BRADMAN: It just seems to me -- I've had discussions about this before, but given that there's a lot of concerns right now about exposures to this material and that it's surprisingly widespread, maybe another piece of this work or maybe, you know, an ancillary piece would be to try to pinpoint where the material is getting into the water systems, and if that points to potential interventions.

DR. REYNOLDS: And in fact, we have had discussions with -- do you want to comment on that at all, because we have been discussing this with some of amount of animation with our colleagues in Biomonitoring.

DR. PETREAS: Well, we think it has to do with the --

DR. REYNOLDS: The foam.

DR. PETREAS -- the foam used for firefighting. So different military facilities, air forces -- airports, refineries, other places where these are used, but this is only speculation. We tried to do GIS, tried to identify where the -- within California where the -- we got a geologist to see whether the wells are near downstream

from certain -- but the positions of the wells are secret. So for security, I guess, we cannot get --

DR. REYNOLDS: So, I think --

DR. PETREAS: -- the coordinates.

DR. REYNOLDS: -- these are definitely, I think, questions that need to be pursued. And I think, you know, this is just one study, but it's happening in the context now of several studies that are coming out that are really underscoring that this is -- that we should -- these shouldn't be things in our drinking water. So we should really be pursuing this, and it's something that is amenable to remediation.

So not all environmental factors are easily amenable to remediation, but this could be something where something could be done.

DR. PETREAS: If I can add something that given that, as Peggy was saying, the guideline was lower, significantly, in fact, many individual states have even stricter -- I think, Virginia 16, 14 -- not 70. Our lab, incidentally, is working on a method that has much, much lower detection limits. So I think all the laboratories were contracted by EPA to provide next round of measurements -- will have to meet these very low, very sensitive methods. So next time we'll have even more resolution about, you know, differences in the

concentrations in water.

DR. REYNOLDS: Thanks.

CHAIRPERSON BRADMAN: Thank you.

Dr. Quintana.

PANEL MEMBER QUINTANA: Hi. That was a great presentation. I had a couple questions. One was about the POPs study, and something that's always interesting to people is diet. And you have such a huge cohort. I'm -- potentially, I'm wondering if you've looked yet at diet, like vegetarianism versus not, or that kind of thing, and how it affects body burden on top of other exposures.

DR. REYNOLDS: It -- the short answer is we do have a fair amount of dietary data on the cohort. And some repeated dietary questions. Initially, back in 2010 when we started this, it didn't appear that for the PBDEs at least, that the food chain was a major vehicle, but now, this is changing. And we do intend to look at some -- our dietary data, I think, will be helpful, but it may not be perfect.

Just like with the water study, there could be some timing issues, so we -- you know, in 1995, we asked a very -- we used the Block Questionnaire, which is extremely detailed, and a lot of our participants complained that we asked so much about diet. We revisited this in an abbreviated form in a subsequent survey. And

in subsequent surveys we've tried to ask some targeted questions about particular dietary factors.

So it's definitely something that we do need to look at in the context as we move towards risk analyses. I agree, we definitely need to look at it.

PANEL MEMBER QUINTANA: My second question is actually about a study you listed, but didn't present, which was air pollution and cardiovascular risk. I remember you had a study a couple -- 3 or 4 years ago, showing that ultrafine particles seem to be more significant than PM2.5, if I recall, or something like that.

DR. REYNOLDS: This is a recent one, yes.

PANEL MEMBER QUINTANA: Or recent. That was I guess -- it seemed like awhile ago.

DR. REYNOLDS: Uh-huh.

PANEL MEMBER QUINTANA: But it made me think about Sara's question about how to look at diesel versus non-diesel. You had that -- I presume you guys did a bunch of spatial mapping and estimates of traffic exposure --

DR. REYNOLDS: We have.

PANEL MEMBER QUINTANA: -- and you potentially have a ready sample of participants -- can maybe even resample for urine markers of diesel that are quite

well-characterized. It was just an idea. I was thinking based on our earlier discussion, but --

DR. REYNOLDS: Yeah, I do think that would be interesting. We've been really interested in diesel, and we have been -- we have been working to characterize it. We don't have a currently funded study to look at air pollution. But yeah, we do have -- I think, diesel that's primarily in urine. Would that be -- the metabolites would be in urine. And so we have a much smaller subset of samples -- of urine samples than blood samples. One of our -- one of our challenges now. We have a lot of blood, but not nearly as much urine, which might be important for environmental studies. And then some things are more transitory than others in urine obviously, so there's timing issues.

But absolutely, diesel is something that is on our wish list. It is something we really do want to pursue and think that -- I think that this cohort could be very helpful in terms of addressing some of those questions.

PANEL MEMBER QUINTANA: Especially not even looking at case-control, because those are very precious samples. But just as -- in terms of validating the exposure marker --

DR. REYNOLDS: Yes.

PANEL MEMBER QUINTANA: -- you could perhaps look at controls. And it looked like you had the ability to go back and recontact participants potentially. And you could get a larger urine sample perhaps.

DR. REYNOLDS: We could. We -- you know, out of quick funds. Certainly, we can.

PANEL MEMBER QUINTANA: No, I know. It just -- I just think -- it just seems like it's such a well-characterized population. Maybe you've done a lot of that work already with that traffic study, that it would be ready to go, you know.

DR. REYNOLDS: We did an earlier study where we were looking at air pollution and we were interested in PAHs. And so we did look at 1-hydroxypyrene assays in a subsample for which we had urines, and then looked at how those related to traffic patterns and computing patterns and various things.

Fortunately, very few women in the cohort were active smokers, so we didn't have the confounding effects of tobacco. But I think the whole -- the whole issue with diesel is something that we should try to pursue with greater vigor, I think.

PANEL MEMBER QUINTANA: That's interesting.

DR. REYNOLDS: You're right. Good suggestion. I can quote you on that in my next grant proposal.

PANEL MEMBER QUINTANA: Yes, very important.
CHAIRPERSON BRADMAN: We have some time now for public comment.
MS. DUNN: Didn't get any through the email.
CHAIRPERSON BRADMAN: Anyone here?
Okay. So then I guess we have some -- a little bit more time for any Panel discussion or continued questions from the comments?
Sara, do you have one?
MS. HOOVER: I have a couple.
CHAIRPERSON BRADMAN: Okay. Great.
DR. REYNOLDS: You're going to ask me a question?
MS. HOOVER: Yeah, I'm going to ask a couple questions of you guys. Question one -- just following up on this. Yeah, the diesel method, the current method, takes actually quite a large volume still. What, Asa, it's about 10 to 30 ml was the volume required?
CHAIRPERSON BRADMAN: For the -- actually, he -- well, preferred 100 ml.
MS. HOOVER: Yeah.
CHAIRPERSON BRADMAN: But we were able to use 30 ml for --
MS. HOOVER: Closer to your mic, Asa.
CHAIRPERSON BRADMAN: I'm sorry. Chris Simpson's method prefers 100 ml. However, for the pilot study we

did with kids, we ended up using 30 ml, and that was adequate. I think he had to tweak his method a little bit, but it is volume intensive.

MS. HOOVER: It's VERY low levels.

DR. REYNOLDS: Yeah, for our -- the little pilot study that we did where we collect urine samples, we collected 24-hour urines. So we had a lot of urine, some of which has died in a freezer in the Health Department, but we still have some left. So, you know, we could -- I think it would be worth pursuing what is the -- what is the minimum amount, or launching a study where we go out and we collect urine. Certainly, it's easier for us to get urine from people than blood, but -- although -- although people have really been very -- our cohort members have been very cooperative and enthusiastic about providing biospecimens, so it's a dedicated group, which is nice.

MS. HOOVER: And then I had a just a question, and I -- this might be for Myrto or you, but the -- in the paper with the PFASs in drinking water, it was -- if it was detected at all, like that was the measure, but then in your -- and I took that to mean any PFAS, but you actually looked specifically at the detect of a particular PFAS, and the level of that PFAS?

DR. REYNOLDS: (Nods head.)

MS. HOOVER: Okay. So it was linked by that specific PFAS -- not detection of any PFAS?

DR. PETREAS: It had to be the same, so PFOS with PFOS.

DR. REYNOLDS: Yeah. And those were the two most common.

MS. HOOVER: Yeah, that made sense.

And the next question I had for you is related to the -- one of your studies you talked about where you talked about the BPAs.

DR. REYNOLDS: Uh-huh.

MS. HOOVER: And I think you mean BPA analogs, like -- is that what you mean or do you mean BPA specifically?

DR. REYNOLDS: I'm going to let Myrto -- this is in blood, which we never thought we would try to do.

DR. PETREAS: Yeah, it's BPA. One BPA, but along then we do bromophenols, the same methods, so we can see bromophenols.

MS. HOOVER: Okay. So basically your phenols panel in serum is what you're talking about?

DR. PETREAS: Yes.

DR. PARK: You know, we measured BPA. Main target was BPA, but we were able to -- our method, Dr. Sissy Petropoulou's method can identify 3 more

bromophenols and also tetrabromobisphenol A and other reactive flame retardants. So that's what we did, but BPA only, not the analogs.

MS. HOOVER: And my last question, I'm just going to get them all out there. I know you didn't want to say much about the time trend, because it's preliminary, and I think that's right at the moment where you started feeling time pressure. But could you say more about like what your feeling is about what you saw with those time trends? I was just looking at the slides and --

DR. REYNOLDS: Well, we -- you know, there are -- there's -- there are some -- we haven't had a chance to really thoroughly examine those data yet. And so one of the things we really want to check before we talk about whether it looks like there's any trend is we want to take a look at some of the covariates. And I want to make sure, for instance, that the age structure was the same with time, since we know that some of these analytes -- body burden is higher with age, so that it's not an -- so that if there is -- if we do see a trend, it would not be an artifact of something that we already kind of know would be associated with the particular compounds.

So that's one of the reasons I sort of hesitate. We've really been interested in the general issue. And I know that ECL has done so much work looking at these time

trends. And it's important to know, from a public health point of view, whether there's any evidence that the body burden levels are changing vis-à-vis changes in regulatory activities and anything else.

So I think it is an important question. I hesitated in a way to include it, because it is so preliminary. But I also think that it's something that is worth thinking about further. And certainly Dr. Petreas or Dr. Park can come back to the SGP in the future when we've teased this out in greater detail, and report back on whether those very preliminary things look like they're going on.

The thing that was most striking to me is, in the wake of several reports of the decline over time, secular declines in body burden for PBDEs, that we did not see it, but this is a particular -- it's a 5-year time window. Although, some of these reports have been very short periods of time. It's a 5-year time window. And, you know, a lot of those studies have been in breast milk in younger women. And this is a somewhat different demographic. So I'm not sure -- I'm not -- I don't think we're sure exactly how to talk it through. And so the sort of -- we didn't know whether to present something so preliminary, but I think it's a little provocative than we're more thinking about, so maybe we wouldn't do it in

the future. I don't know.

(Laughter.)

DR. PETREAS: Yeah. We were startled when we saw these non-trends. We don't know. As Peggy said, we're going to look more deeply into that. The other anomaly is that the PFAS -- the PFNA should have been increased, because this -- the declines in PFAS is -- are consistent with NHANES. NHANES, over time, things have declined, except for PFNA, which is what we had seen with California blood, you know, a few years ago in Dr. Wang's paper.

So that's another anomaly. We're showing declines in all the PFAS, including PFNA, which is unexpected, but again, it's a different demographic. Maybe shorter period of time. Who knows? Next time.

DR. REYNOLDS: Stay tuned.

MS. HOOVER: Yes.

CHAIRPERSON BRADMAN: Is there anyone else?

Martha, did you have a question?

DR. SANDY: Martha Sandy.

So this discussion just makes me think maybe if you can go back to those participants and ask them some questions, another questionnaire. Maybe that's too expensive. But this demographic -- maybe they don't buy new furniture. They lived in their house longer. They're older. These are accumulating substances, but the

different PFOS you mentioned, maybe that's in newer products, and this demographic is not purchasing those.

DR. REYNOLDS: We actually did have a questionnaire in association with the blood draw. Its primary purpose was really to assess menopausal status in these women, and some factors that should be really influencing breast cancer risk, but we also -- I'm sorry, I took this off -- we also did ask some questions that, at the time, we thought might be helpful in terms of predicting body burden of the PBDEs -- about furniture, and carpeting, and the year the house is built, and, you know, traveling in airplanes, and doing various things that at the thought -- at the time, we thought be a questionnaire might be helpful and be indicative.

And we're -- originally, we actually did a poster presentation at a meeting with the first 300 or so. But we actually had an opportunity to get those questionnaire data for the entire POPs sample now. And so we want to reanalyze it with the much larger data set. The preliminary data suggested that depends on the congener. So you don't -- you're not seeing -- it's not lock-step. And that's probably not a surprise, but you're not seeing the same associations across the board for all the congeners, which is one of the reasons we want to be extremely careful in our analysis to, you know, pay

attention to these various -- this, and not glob too much summary data together. But stay tuned, we're working on that, too.

CHAIRPERSON BRADMAN: Any more questions?

PANEL MEMBER QUINTANA: A question. I was just curious how many of your participants had children -- are pregnant and had children over the course of your study?

DR. REYNOLDS: Not very many, because this is the --

PANEL MEMBER QUINTANA: Not very many.

DR. REYNOLDS: -- this is -- oh, of the whole study?

PANEL MEMBER QUINTANA: The whole study.

DR. REYNOLDS: Oh, the whole study. Okay. We have lots of births in the whole study, starting from 1995. But in the POPs cohort, because this just started in 2010, the women in the POPs study would have had children earlier. But the age range from 40 to 94, sort of, they -- this is not a particularly parous subgroup of the sample, at this period in time.

PANEL MEMBER QUINTANA: Right.

DR. REYNOLDS: But we do -- and actually, we -- one of the NCI studies that I didn't talk about is one in which we were interested in the window of susceptibility around the time of the first full-term pregnancy. So we

linked the cohort to California birth records, and actually do have data on first births, and subsequent births, and cohort members who delivered in California, in addition to the fact that we actually have questionnaire data, where we ask them, you know, when they were pregnant, and, you know, how many children they have, and what year, and what the outcome of the pregnancy was.

So we have both birth registry data, and questionnaire data to kind of get a hold -- a little bit of a handle on that within the whole cohort for the larger study.

Does that answer your question?

PANEL MEMBER QUINTANA: Yeah. No, I was just thinking about the Kaiser Three Generations Study and thinking it would be very interesting, especially for the epigenetic -- with your exposure information and the epigenetic data and a major route of exposure being the body burden of the mom being transmitted through the breast milk, would be quite interesting.

DR. REYNOLDS: It would be.

PANEL MEMBER QUINTANA: So you have a future study, not that you can do everything.

DR. REYNOLDS: We don't have -- we don't have nearly the biobank that that study has. But yes, it would be. And there are lots of -- it's been a nice

opportunity -- sorry. There have been nice opportunities over time to continue to enhance, sort of, the resources that are available in this data set. And we've been very lucky to have collaborators come to us and say, I'm really interested in this. Can we take a look at this?

And so it's been -- the Teachers Study, in general, has been a valuable resource, I think. And this POPs study that was just one of the -- one of the projects that was funded as the strategic research initiative. It's taken a -- epidemiology -- it takes so long. It takes so long to collect the data that you feel like -- along the way, you feel like, you know, I don't have much to say. It's not like lab studies where you can, you know, generate data within a shorter amount of time. I'm so jealous of some of my laboratory colleagues in that regard.

But, you know, now, I think we have sort of a critical mass of information that begins to start to hang together in ways that I think will be very productive going down the road. And when I was asked to talk to you a little bit about the study, I just said -- but we haven't done the risk analysis. This is too early. We're not going to be able to talk about that. But I hope that you do find it interesting. What we are sort of doing along the way and when you get updates from our colleagues

at the -- in the Environmental Chemistry Lab along the way, see where some of this is going.

MS. HOOVER: So, I mean, we do have some extra time. Don't take your mic off yet.

(Laughter.)

MS. HOOVER: And actually one of the things that I just -- I know people are aware of Peggy's long distinguished career, but some of your expertise is in community engagement, participatory research, recruitment. And, you know, we're just about to launch these studies, community-based studies. And I just wondered if you had any comments about, you know, some successes, just based on your experience?

I mean, I know this is off the top of your head, but I've just been really impressed. I mean, she gave a wonderful talk about one of her studies and addressed some of these issues. And it seems like an opportunity to pick your brain about those kinds of things.

DR. REYNOLDS: That was something completely different. Of course, we have a few studies that have been again funded by the California Breast Cancer Research Program, as part of their community research collaborations. And those -- those, by design, are, you know, real partnerships with the community. In each case, the projects we've done have been initiated by the

community, not by us. So it's not scientists sort of parachuting in and saying, oh, we want to study you.

And that is, I think, a good thing and an important thing. In terms of the questions, I think it can be challenging. And, as you well know, because you all helped us with feedback, this earlier discussion about providing individual feedback is a non-trivial and difficult issue, and we've talked about it a lot.

I think you talked about it at the last SGP, to some extent, but -- so we are -- it's very labor and resource intensive to be able to -- this is just my point of view, but I don't think it's unique -- to be able to provide feedback to people that's meaningful and contextually meaningful. You know, I can give you a number, but what does that mean?

So to be able to talk about that -- and then in this line of work, we're looking at things where we don't really know what it means for health. We don't know what this level of arsenic means for breast cancer risk, because we haven't done that study. But it's part of the community engagement and participation process.

So, in the other study you're talking about, the Chang study, thanks to your help, Duyen's help and the help of several people in Biomonitoring, we were able to piggyback on some of the materials you all have developed

to try to put results in context, somewhat massaged in the context of this particular community and their particular concerns, but that was invaluable.

We are now in the process -- you all mentioned earlier this morning, the problem of the environmental sampling -- household environmental sampling. And naively when we went into this, we thought, oh, we've gotten through all the IRB issues for giving people back results about what's in their bodies. This has got to be a piece of cake.

Well, actually this is much more difficult, because there are legal ramifications to be telling people what the level of arsenic is in their tap water, for instance. And so this has been a major struggle in terms of doing this in a way that is faithful to the results return issue, but is meaningful, but is -- our IRB tortured us for nearly a year trying to figure out -- what are -- how our consent forms should be formulated, so that people are fully informed.

And just this article, I think, you mentioned the EHP article that just came out. Our friends and colleagues in Silent Spring sent us a preprint of the article. This is the Harvard lawyer who put together this very nice assessment. The conclusion of which was, well, it really hasn't been tested in the courts. And so we

still don't really know. And so, it was a lovely article, but we still don't have real resolution about how to do this. And yet, this is something that with -- for community studies we think is extremely important.

And I'm like you, if I'm in a study like this, I want my results, even if you can't explain them to me. But that doesn't mean that I could do that to people without -- you know, I have to more responsible about it. I think we have to be more responsible about it.

And my little plug for the -- for California Biomonitoring is that I think that the time that you all have invested in trying to put together those kinds of materials that will speak to different community concerns is very helpful. And I appreciated it as a colleague.

MS. HOOVER: I just wonder, I know that's been a big issue. And I was also amazed because you called me early on about, you know, yeah, we haven't had to address. And I just wonder can you say anything, or maybe it's confidential, but can you say anything about how you are approaching it. Is it really just like consenting and making clear like what the issues are or --

DR. REYNOLDS: So -- yeah, so we've finally resolved with our IRB an appropriate consent form. And one of the -- one of the challenges, which I'm sure your attorney can appreciate is that it's different if you're

asking a homeowner to consent or a renter to consent.

So in the case of a renter, we need to bring in the landlord, and it becomes a lot more complicated. And it's -- it's sort of like the old -- in the early days when the federal certificates of confidentiality were issued, there was required language that you had to put in your consent form that was this long, like, well, if you're convicted of a crime, or suspected of whatever, we have to -- you know, it was very off-putting language in a consent form.

That level of detail is no longer required for the federal certificate of confidentiality. But similarly, for environmental sampling in the home, we have to fully inform people. And we're just in the process of doing this part of the study now. And there are, I will say -- I don't have the data at hand, but there are a number of people who are very enthusiastic about participating in this study, and they gave us their urines, and they want their results. And we get to this part, and they read the consent form, and they go, oh, I'm not sure I want to know.

(Laughter.)

DR. REYNOLDS: So I think this is a process. And I will be very interested to see, along the way, sort of how this gets teased out, because I think -- I just don't

think it's a -- it's not simple. You know, I wish it were, but it's not. And so I appreciate the fact that this Program is trying to start to think about that, because it is the next logical step.

Okay. Let's look at what's in people, let's look at what's in their environment. And then you get into issues that are much more complex than we actually had anticipated naively. Does that --

MS. HOOVER: Yeah. Thank you so much. Appreciate the input on that.

DR. REYNOLDS: I don't have an answer, just working on.

MS. HOOVER: That's good process to hear. That's good for us to hear about that, because we might confront that in some studies, if we decide to add on components like that.

DR. REYNOLDS: Yeah. Oh, boy.

MS. HOOVER: So it's just -- I wanted to make people aware of some of the things you went through in dealing with that.

DR. REYNOLDS: This is because I've been torturing my colleagues in Biomonitoring California to say have you guys figured out how to deal with this?

(Laughter.)

CHAIRPERSON BRADMAN: Well, thank you. That was

a very interesting presentation discussion.

DR. REYNOLDS: Thank you.

CHAIRPERSON BRADMAN: So we're a little bit ahead of time. I'm wondering maybe we should move on to the next agenda item?

MS. HOOVER: No, we should take --

CHAIRPERSON BRADMAN: Take a break now.

MS. HOOVER: -- take a break now, and -- I think, right? Are you -- how are you feeling?

THE COURT REPORTER: I'm okay if you want to move on.

MS. HOOVER: All right. Laurel, are okay with --

DR. PLUMMER: A quick break.

MS. HOOVER: A quick break. Okay. Let's do the quick break, 15-minute break.

CHAIRPERSON BRADMAN: Okay. So we have a 15-minute break. Why don't we make it 10 --

MS. HOOVER: No, 15 for the transcriber.

CHAIRPERSON BRADMAN: Oh, okay.

MS. HOOVER: So let's just keep it at 15.

CHAIRPERSON BRADMAN: Okay. So then we'll see everyone back at --

MS. HOOVER: 3:02.

CHAIRPERSON BRADMAN: Yeah, Just after 3:00, so get here at 3:00.

MS. HOOVER: Yeah.

CHAIRPERSON BRADMAN: Okay.

(Off record: 2:47 p.m.)

(Thereupon a recess was taken.)

(On record: 3:02 p.m.)

CHAIRPERSON BRADMAN: Okay. We'd like to reconvene for the afternoon. It's time to start heading back to your seat of preference. I think we're -- oh, great. We're -- I think we can get started now. I'll take this time to introduce Dr. Laurel Plummer, who's a staff toxicologist in the Safer Alternatives Assessment and Biomonitoring Section with OEHHA for now --

(Laughter.)

CHAIRPERSON BRADMAN: We'll miss you.

DR. PLUMMER: Thank you.

CHAIRPERSON BRADMAN: -- who will present a brief summary of information relevant to 2 possible classes of chemicals used in -- for UV application, benzophenones and phenolic benzotriazoles for future consideration as potential designated chemicals.

And I just wanted to clarify, are we going to be voting on these today or is this really just about discussion -- about consideration?

DR. PLUMMER: Yeah. So today is just a discussion item. It's like a preliminary screen.

CHAIRPERSON BRADMAN: Right. Okay.

DR. PLUMMER: So just to kind of put some of these ideas out there. And then, you know, at a future date you can -- at the end you can propose an approach, whether you'd like to pursue designation for one or both, and I'll go into those options at the end.

CHAIRPERSON BRADMAN: Okay. Thanks.

(Thereupon an overhead presentation was presented as follows.)

DR. PLUMMER: So I'll just start off by letting the Panel know, and also the folks on the phone, there was a document posted on the website. There's also a copy in your folder materials that you have there on your desk.

So today, I'm going to be talking about some information I've gathered on 2 specific classes -- possible classes of chemicals that are used in UV applications. And so I'll just switch to the next slide.

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DR. PLUMMER: So the next slide. The purpose of the agenda item today is to discuss these classes, which we're defining UV applications as uses, including as UV stabilizers, UV absorbers, or photoinitiators. These 2 classes you can see here are benzophenones and phenolic benzotriazoles. And today, we're just looking to obtain input from the Panel and the public on next steps

regarding these possible classes.

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DR. PLUMMER: Okay. So next slide.

So why classes?

We are applying the approach of looking at chemical classes in this research, as we have done before, and you heard the talk from Dr. Shoba Iyer in July about possible classes for pesticides. So you can think about this as sort of a parallel stage of looking at these possible classes.

So our reasons for taking this class approach, looking at chemical classes or groups, rather than individual chemicals -- is resource efficient for chemical selection in the Program. It allows the Program to quickly respond to shifts in chemical use, and target emerging chemicals of concern.

It's also beneficial from a lab perspective looking at development of broad lab panels for classes of related chemicals. And also, as we heard a little bit from Jianwen about the non-targeted screening work, it's a good approach to screen within a class of chemicals.

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DR. PLUMMER: All right. So the next slide, slide number 4. This slide is just to provide you -- to provide everyone some background on the criteria for

recommending designated chemicals. And even though today, we're not at that stage for these groups, this bulleted list gives us an idea of the types of topics we research in our screening -- screening work. And so it relate -- the research we do definitely relates to these criteria that are listed here.

And the work includes looking at chemical identity and structure, use and production, and I'll just switch to slide 5.

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DR. PLUMMER: Detections in humans, biota, and the environment, looking at information available on bioaccumulation and persistence and also on toxicity.

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DR. PLUMMER: Okay. So slide 6.

So during my research, you know, there's quite a lot of work that's done on chemicals that are used as UV -- in UV applications. And for the work that I did, you know, I uncovered a lot of information about some other classes, which I have listed here, and compounds. So para-aminobenzoates, avobenzone, which is a single compound, cinnamates, and salicylates.

So there are some other classes that do come up in the literature, but we chose to focus on benzophenones, and phenolic benzotriazoles, for a number of reasons,

which includes laboratory capability, the extent of use, and then also interest by other scientific agencies.

So I have gathered some information on these, but it's not included in today's talk.

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DR. PLUMMER: So slide 7. So, first, I'll discuss the group benzophenones. These are used in sunscreens and other personal care products. They're used in plastics, including food contact materials, paints and coatings, inks and lacquers for paperboard. They're also used in fragrances and in pesticide formulations. So quite a broad range of specific uses, but all related to their UV stabilizing properties.

Benzophenones have the core structure of a ketone attached to 2 phenol groups and they can have various substituents attached to the phenol rings. You can see 4 examples here. And benzophenone-3, which is shown in the top left, is already on the list of designated chemicals, and that's because it was on the list for CDC, so it's automatically added to our list.

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DR. PLUMMER: Okay. So we looked, as I mentioned, into production and import volume in the U.S. And this information is from -- is information compiled by the U.S. EPA. So you can see 2 -- 2 example chemicals

shown here, and these are the 6 that are highlighted in the document in the first table.

So benzophenone and benzophenone-12 are both high-production volume chemicals. And this is based on the 2012 data -- reporting year 2012 data compiled by the U.S. EPA. You can see BP-1, so fourth on the list there, which is also a BP-3 metabolite, had production volume of about 32,000. So, in addition to being a metabolite, it appears there's also some production import volume.

And interestingly for BP-1, we located a significant number, almost 1,700 products, listed in Environmental Working Group's Skin Deep Database as containing BP-1. So there's some suggestion that it's used, you know, actually as the parent compound, in addition to being a metabolite of BP-3.

And you can see there's 2 of our example compounds listed here that had information withheld by the company as its confidential business information. So that's BP-4 and 4-methylbenzophenone.

And, you know, the 2012 data is obviously four-ish years out of date, so we're -- you know, there will be another round of information. Hopefully, that will tell us a little bit more about what's being actually used.

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DR. PLUMMER: Okay. So next slide, slide 9.

We have -- there are several -- many environmental studies that have detected BP-3 in U.S. residents in U.S. studies, and notably higher levels have been found in Californians, including the recent Biomonitoring California publication reporting elevated BP-3 in firefighters. So that was a recent report. The other benzophenones listed here, including BP-1, BP-4 were detected at low levels in urine. And I'll just point out here too that in addition to BP-1 being a BP-3 metabolite, BP-2 and 8 are also metabolites of BP-3. So there's a lot of interrelatedness in this group.

In terms of detections in other biospecimens, BP-4 was quantified in 58 percent of placental tissue samples collected from volunteers in Spain, which is pretty interesting. They -- and you can see it was also detected in urine.

And in addition to BP-3 being detected in urine, it was also detected in serum, breast milk, and adipose tissue. And I'll just note here that BP-3 has a log Kow of 3.79, which is close to the cut-off of 4 that is used by OEHHA as an indicator of potential for bioaccumulation.

And there's some more information about the different parameters in the table in the document that you received.

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DR. PLUMMER: All right. So next slide, some toxicity information that we located for chemicals in this group are highlighted here. So benzophenone is listed under Proposition 65 as known to the State to cause cancer. Several benzophenones have been reported to exhibit estrogenic, anti-estrogenic, and/or anti-androgenic activity both in in vivo and in vitro assays.

And we also consulted, with the help of Dr. Shoba Iyer -- looked into U.S. EPA's, ToxCast database. You heard a little bit on that during her talk in July on the pesticides. And this database displays chemical-specific results from high-throughput assays. And we looked at that for available bioactivity data for benzophenones. And several benzophenones were positive in assays evaluating the endpoints listed here: Endocrine activity, cell viability, cellular metabolism, and then immune- and inflammation-related effects.

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DR. PLUMMER: All right. So with that, I'll switch to the next group of compounds, phenolic benzotriazoles. And this slide shows example chemicals in this group. These are used as UV stabilizers in plastics, and many are approved by the FDA for use in food contact

materials. Experimental studies have also highlighted potential for migration of UV P, which is also called commonly drometrizole, and study -- experimental studies have shown that that compound can migrate from high density polyethylene plastic into milk and food simulants. So there's some indication of migration there.

And some phenolic benzotriazoles were identified as being found in a small study of plastics from electronic equipment, so the plastic casings. And it was a fairly small study, but still, you know, an indicator of use there. And you can see these compounds have a heterocyclic ring that contains 3 nitrogen atoms and then a phenolic group with varying substituents. So UV P is a fairly small compound, and then ranging all the way up to some of these other ones shown here, 234 and 328, that have additional rings and branching.

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DR. PLUMMER: So looking at the U.S. import -- production/import volume for this group of chemicals, we can see that 2 of the ones highlighted for this research, and in the document, had high-production volumes. So UV 234, which I showed on the previous slide, was 1 to 10 million pounds, and UV 328 was over 2 million.

And you can see similar patterns of some compounds being withheld as well by -- as confidential

business information.

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DR. PLUMMER: So we also looked at the log Kow and bioconcentration factor information. And I've just summarized it in this slide here. There's also more information in the document. You can see that many of these compounds have concerns for persistence and bioaccumulation, again based on OEHHA's Green Chemistry Hazard Trait regulations.

And in addition to that, UV 327 and 328 have been identified as very persistent and very bioaccumulative by the European Chemicals Agency.

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DR. PLUMMER: In terms of biomonitoring -- available biomonitoring data, we located a study looking at levels of several phenolic benzotriazoles in a study of breast milk. And this is published in 2015, so it's fairly recent, and -- but the samples were collected in 2011. We -- they -- the study reported the highest levels were found for UV 328, which I've highlighted here. Ninety-eight percent detection frequency for that compound, with an average of about 64 nanograms per gram and a maximum of 334.

And in this same study, the researchers looked at the fragrance chemical tonalide, which I have at the

bottom of this slide, which is actually a designated chemical for Biomonitoring California. It's a synthetic musk. And the authors noted the similarities in the average levels detected, and also the maximum for these 2 compounds.

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DR. PLUMMER: Phenolic benzotriazoles have also been detected in studies of biota. UV 328 was detected in plasma in a very small study of dolphins in Florida.

UV 327 and UV 328 were found in a separate study looking at porpoise blubber collected in Japan. And a number of studies have detected phenolic benzotriazoles in aquatic organisms including fish, mussels, and some other intertidal species. And specifically, in a small study of blue mussels collected from the U.S. Pacific coast, in 2004, 2005, around then, UV 326, 27, and 28 were reported as being found.

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DR. PLUMMER: Overall, there's very limited toxicity information on the phenolic benzotriazoles group with regard to human exposure, toxicity, or even, you know, pharmacokinetics. However, the National Toxicology Program is conducting studies on several chemicals in this class. And there's information available on their website related to the studies being conducted, but they are

looking at toxicokinetics and genetic toxicity for several compounds in the group.

A few published studies report indications of anti-androgenic activity and activation of the aryl hydrocarbon receptor pathway for some benzo -- phenolic benzotriazoles.

And we also consulted ToxCast for information on chemicals in this group as well. And they were found to have -- several were found to have positive results in assays that evaluated endpoints related to endocrine activity, aryl -- AhR pathway activation, xenobiotic metabolism, cell proliferation, again immune- and inflammation-related endpoints.

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DR. PLUMMER: All right. So basically the options for the Panel today:

You know, we can discuss these groups, and the Panel can request that OEHHA prepare a potential designated chemical document on one or both of these classes that we have researched and presented today.

You can propose further screening or continued tracking of one or more of the classes, advise no further action, or if you have other suggestions for possible classes we should go back and look at more, we're open to that as well.

So with that, I will take any questions.

CHAIRPERSON BRADMAN: Any questions from the Panel?

PANEL MEMBER McKONE: So the production volumes that you had, those are quite large, but these are not all -- I mean, that doesn't relate to what's used as sunscreen, right? We're really -- I mean, we're -- these are compounds that are often used in sunscreen applications, but I'm --

DR. PLUMMER: Yeah, yeah.

PANEL MEMBER McKONE: Is there some way of figuring out what fraction of that actually ends up on consumers, and what part is used in other types of applications.

DR. PLUMMER: I wish. I wish there was. I mean, especially because a lot of the benzophenones are used for both applications. And, in fact, we know benzophenone is really -- you know, it's widely used, but it actually doesn't -- or it's -- you know, there's evidence of exposure. But when you look at the production volume, it's not -- it doesn't really appear to be parallel.

PANEL MEMBER McKONE: I mean, again, it doesn't -- I don't know about our decision, but it does reflect a very interesting question of when we've -- you know, if results indicate high levels in blood, is it

coming from people applying it, or, you know, food residues, or hand-to-mouth activity because it's in consumer products --

DR. PLUMMER: Exactly.

PANEL MEMBER McKONE: -- and that might be hard. Okay.

DR. PLUMMER: And I didn't talk much about it here, but there have been studies that look at levels of both of these chemical classes in dust. And the levels are relatively low compared to some of the standard compounds we do worry about as being in dust, PBDEs and some of the other persistent things, but it seems like there are more and more studies being done to kind of look at, you know, levels in the environment and in the indoor environment as well.

PANEL MEMBER SCHWARZMAN: Obviously, these compounds have lots of uses and they're strikingly varied uses. I think it's uncharacteristic actually to have compounds that have such a wide variety of applications. But because one of the primary applications of the benzophenones at least is in sunscreen, what does the FDA have to say about this? Is there any -- or does it fall under cosmetics, and so they're not regulated in that sense by the FDA?

DR. PLUMMER: Right. That's a great question.

So there are -- gosh, I believe it's just under 20 approved sun -- active sunscreen ingredients. And some of the benzo -- so benzophenone-3 is on that list, benzophenone-4, which is called also sulisobenzone, so you could see that. Benzophenone-3 is oxybenzone on, you know, a label.

So there's -- I think by virtue of saying these 2 are okay as active ingredients, they're basically saying it's okay. And some of the -- some compounds were from some of the other classes that I didn't go into detail in for this particular research, are also on the list of approved substances.

So they regulate it by percent of the whole total of ingredients. I think it's -- you know, ranges sometimes up to 10 percent, depending on the compound. So that's one way they do try to limit the amount that could be added.

CHAIRPERSON BRADMAN: So the laboratory here is already measuring BP-3.

DR. PLUMMER: They are, yeah.

CHAIRPERSON BRADMAN: And maybe that's not for discussion today, but is -- if we were to designate this as a class, in terms of analytical methods, would it be relatively easy or, you know, un -- less complicated to extend the analysis to this class using existing methods?

DR. PLUMMER: I mean, I could let Jianwen elaborate a little more if he wants to, by I think it seems like that would be the case to me.

DR. SHE: I think -- and like the few ones we mentioned here, BP-1, BP-2, BP-4, and also you mentioned the BP-8. And although that's low reportable, the BP-12, I think it's relatively easy to enter a method. But I also like introduce Dr. Yu-Chen Chang, she's working on it, if you have any comments or -- okay.

She's possibly agrees with me, I hope.

(Laughter.)

CHAIRPERSON BRADMAN: Dr. McKone.

PANEL MEMBER McKONE: So the category is broadly UV-absorbing chemicals, right?

DR. PLUMMER: That was essentially what shaped the research, and where it sort of -- you know, it evolved from the concern over BP-3 having high levels, and, you know, as we found in the firefighters study. But when we actually look at the group, it's not going to be -- when it's listed, you know, potentially in the future, it will just be benzophenone, so we won't actually have, you know, a specific use associated with it, partially because, you know, we understand they are used to prevent degradation of plastics or a wide variety of things, but I think just keeping the class, you know, chemical structure-focused is

the approach that we're leaning towards.

PANEL MEMBER McKONE: So my other question is that people are going to look at this some day and say what about other sunscreen agents, like the zinc oxide, titanium oxide? Is there -- I mean, part of it is they may be very difficult to detect, but leaving them off almost implies that there's no interest in those.

And I'm assuming there's interest and they may be not there, because, A, they're considered not toxic, or B, they're too difficult to analyze.

DR. PLUMMER: Yeah. I think -- so I mentioned, you know, a couple of the reasons why we chose these 2 groups. And they really rose to the top for the reasons that I mentioned before, not because there isn't -- not because there isn't research being conducted or even, you know, some of -- some compounds in the other groups I mentioned on an earlier slide, they have measured those, you know, in the environment, things like that. But I think that could be something down the road to look at, but these 2 really rose to the top in terms of the various factors of laboratory capability, and also interest by the NTP in studying the phenolic benzotriazoles group.

So I think, you know, there is -- I don't mean to imply there isn't interest or information on those other classes and compounds, but especially looking at, you

know, ability to biomonitor was another thing we focused on.

CHAIRPERSON BRADMAN: Sara.

MS. HOOVER: Yeah, that's -- I completely agree with what Laurel said, but I really want to emphasize that we are not addressing all chemicals used in UV applications. That's not the point of this item, and we have not vetted everything and said these are the 2 top. No way.

It's just, you know, Laurel has actually been researching this for over -- over a year, I would say, right --

DR. PLUMMER: Um-hmm, yeah.

MS. HOOVER: -- looking at the literature. We called it preliminary screening information. So any thoughts about other classes you'd want us to focus on? These are the 2 we chose, but it's not saying that these are the only 2 that would be of interest, absolutely.

DR. PLUMMER: I think Oliver had a question.

CHAIRPERSON BRADMAN: Why don't we take one more comment from the Panel, and then we'll have some time for public comment, and then also following that, more discussion. Thanks.

PANEL MEMBER FIEHN: This morning, we heard about chlorinated benzophenones, but they didn't show up in

these preliminary overviews. Are these used for different purposes or --

DR. PLUMMER: So you're right. That's true. And I noticed that when I saw Jianwen's slides that focus on the chlorine. And none of those came up in my -- from my perspective that I was looking at the research, but -- that's out there, but there is quite a long list of compounds. Methylbenozphenone is one of them. Benzophenone -- that have specific uses in -- as inks for food packaging, like the paperboard cardboard. There is -- I mean, I found -- I think Sara actually found a website that just listed more than I could, I mean, process really, just all kinds.

And I didn't -- that's one place maybe where the chlorinated things are used, but I don't know, you know, what their specific use is, but that would be of interest for sure to continue looking into. I think most of the ones in the list that we found for food packaging, I looked -- I checked them for the use in the U.S. EPA database, and there wasn't -- there just -- it was kind of like a dead end in terms of the information available on those. So, you know, I didn't pursue that in detail, but that's a good question.

CHAIRPERSON BRADMAN: Why don't we take a few minutes for public comment. Veena Singla from NRDC.

Thank you.

DR. SINGLA: Good afternoon. Thanks so much for a very interesting presentation. And I wondered to what extent if you knew chemicals from either one of the classes might be used in gel nail polishes or gel nails as photoinitiators? I know photoinitiation is one of the functions mentioned, because it's definitely a -- gel nails are becoming very popular and could represent widespread exposure potential.

DR. PLUMMER: Yeah, that's a really good question. So in looking at, you know, how some of these compounds are used, I really -- I looked kind of anecdotally at the Environmental Working Group's Skin Deep Database. And BP-1 like -- you know, there were pages and pages of, you know, 1,700 products. And many of the top -- I didn't go through every page, but many of the top were nail polish uses actually.

I like your point about the gel specific use, but I didn't go -- I didn't like really investigate which type of nail polish they were, but it's definitely a possibility. And that's -- you know, that's a huge, you know, use out there. So, yeah, it's a really good point.

CHAIRPERSON BRADMAN: Are there any comments by email?

MS. DUNN: None.

CHAIRPERSON BRADMAN: No. Okay. Then I guess we turn the discussion back over. We still have a fair bit of time, if there's anymore questions and comments.

Dr. Quintana.

PANEL MEMBER QUINTANA: Hi. I was wondering if you could comment on why the NTP Program chose the phenolic benzotriazoles to study? What was the precipitating event?

DR. PLUMMER: I believe it was NIEHS came to -- like proposed it as a class. And they really did kind of a similar approach to what I did, which is, you know, looking at the extent of use, seeing how several are high production volume chemicals, kind of citing the different parameters that make -- that give them bioaccumulation, persistence concerns.

So it's -- you know, there's -- they're already going with some of the studies. And so hopefully, we'll start to see their results and their reports come out, at least between now and when the document or potential document would be worked on, so it will have more information, especially in different animal studies, and understanding the pharmacokinetics, and maybe where, you know -- maybe the phenolic benzotriazoles could be measured in serum or, you know, other more -- like the samples that Biomonitoring California uses, since there is

indication of exposure in the breast milk for those compounds.

MS. HOOVER: And, Laurel, I'll just add, you perfectly summarized the reason for nomination. I just pulled it up on -- yeah, on the website. High production volume, used as UV stabilizers in a wide variety of industrial and consumer products, possess physicochemical properties that suggest persistence in the environment and potential to bioaccumulate, limited toxicological data, yet reproductive and developmental effects data for several class members suggest potential hazard.

So essentially what got it on our radar -- and in fact it was pretty interesting, because it came on Laurel's radar just from the lit review and for those reasons, and then we found the interest that NTP had flagged. So then we saw we were on the right track for flagging this class.

CHAIRPERSON BRADMAN: So I think if there's not anymore discussion, I think it behooves us to really, as a Panel, decide whether we want to make a specific recommendation in terms of follow up on this as a possible designated chemical.

More questions?

PANEL MEMBER SCHWARZMAN: No, I was just going to make a comment on that.

CHAIRPERSON BRADMAN: Oh, sure. Go ahead.

PANEL MEMBER SCHWARZMAN: Sure. Yeah. I mean, it strikes me that we don't have to decide that this is the only class of chemicals worth pursuing in this use to recommend that it's worth pursuing further. So in a way, I think that might be worth separating those questions, you know, if whether there are other interesting classes. And it strikes me that this class kind of meets a whole bunch of the criteria between production volume, and potential toxicity, and demonstrated either physical chemical properties that would indicate potential exposure and some evidence already of exposure, and almost in that sort of particular window between knowing enough to make it clear that it's worthwhile, and not knowing so much that it's sort of like icing on the cake to find out more.

So with that kind of summary of my thinking of it, I guess I would like to make motion if we -- I don't know that -- we don't need a formal decision-making process, but I would support further investigation of this, as a -- you know, preliminary to creating it as a designated chemical.

CHAIRPERSON BRADMAN: Adopting option 1.

PANEL MEMBER SCHWARZMAN: Yes, option 1.

CHAIRPERSON BRADMAN: Okay. Thank you. I should say for myself, too, that I couldn't have said it nearly

as well as Dr. Schwarzman just did, and she reflects my views as well there.

PANEL MEMBER McKONE: So I'm strongly inclined to agree, I mean, that this should -- that it would be nice to move forward.

I don't know, I think it would be nice to also suggest that we look at other -- you know, that some work begin on looking at the other UV screens that people use.

DR. PLUMMER: Right, like continue tracking.

PANEL MEMBER McKONE: And the reason I bring that up is I know that you have a process for looking at these. But when it goes out to the public, there's often an implicit sort of interpretation that you're ranking and saying these are -- you know, people are going to say, oh, they're looking at these sunscreens, so I'm going to use a different one, because the State is looking at those, they must be bad.

DR. PLUMMER: Right.

PANEL MEMBER McKONE: I know that's not the intent, but that happens -- so I think just for, you know, the broad interest of consumers and public health that there also be some other activity, you know, just to begin screening feasibility for other classes of sunscreens. So I don't know if that's a separate recommendation or an amendment.

MS. HOOVER: Yeah. Let me just clarify before you go off into this land. So this is preliminary input. No voting. What we want to hear is of these 2 classes -- and I'm not making you pick one this time, so I'm saying both. If you're interested in both, we'll do documents on both. If you say no, no we're really interested in phenolic benzotriazoles, do that first, you can give us that kind of recommendation.

As we said, you know, further screening or continued tracking clearly -- so that's what you're proposing, a broader screening of more categories of UV chemicals used in UV applications. So all of those -- you know, we're just -- we're going to gather, you know, even individual Panel member input and figure out what to do. It doesn't have to be a formal recommendation.

PANEL MEMBER McKONE: So I just want to emphasize, I'm saying I favor going forward on documents for both classes. But also, if there's time and resources to begin -- you know, not to hold off on those, but move ahead on that, but also invest some effort into screening some of the other sunscreens.

So at another meeting when the question comes up and somebody says, oh, you guys ignored the broader classes. Well, you know, these are the ones that -- I agree, these came up first. They're important. We need

documentation on them. And it shouldn't be held up, but we should also be able to answer -- you know, I mean not we, but the State should be able to say, yes, we're looking at other sunscreens and UV --

MS. HOOVER: Yeah, and let me just follow up on your comment a little bit, because it is true we have a process now. And we added this new step actually to get exactly this kind of input from the Panel. Like before we go to a full document, we want to make sure what do you guys think?

And then behind any full documents we're working on, there's preliminary screening that's going on. So you're recommending that we keep our focus in this category of chemicals is actually what you're saying.

PANEL MEMBER McKONE: Yeah, the broader category of chemicals and move forward in the 2 classes that you're already ready to move on and give us documents to look at.

MS. HOOVER: Understood.

DR. PLUMMER: Thank you.

CHAIRPERSON BRADMAN: Any other comments, Panel?

PANEL MEMBER SCHWARZMAN: I guess I just have one thought echoing something that Dr. McKone was just saying. I have less interest I think in the titanium dioxide and zinc oxide investigation, but they might still stay on the radar. I mean, there's so much known already about -- but

the key considerations there are occupational exposure to particulate -- you know, to particulate form of the compounds.

But I'm interested in this list you gave us at the beginning, it's on slide 6 --

DR. PLUMMER: Right.

PANEL MEMBER SCHWARZMAN: -- of the other compounds used in UV applications. And I appreciate Dr. McKone's sort of impulse in this direction. It almost accomplishes at a different level what you try to accomplish in addressing chemical classes. And it has to do with the sort of moving targets as pressure is put on one type of compounds -- one class of compounds used in a particular application or for a particular function, the tendency of the market to just bulge into another direction.

And here, we're not capturing all of those just by doing a class approach, because there are other compounds in other classes --

DR. PLUMMER: Yeah, exactly.

PANEL MEMBER SCHWARZMAN: -- that are used in those applications. So I think it does particularly support the approach of keeping an eye on or doing some preliminary investigation of some of the other compounds used in these applications.

DR. PLUMMER: Exactly. And I -- you know, I did actually do kind of more -- in looking at the whole scope of literature, in some cases they'd look at a few benzophenones, they'd look at a few phenolic benzotriazoles, they'd throw in some cinnamates and salicylates. And what happen -- what kind of happened is, as you start to distill the information is, there's 1 or 2 compounds in some of the other classes. So there are -- you know, it's a smaller class, and maybe not used so much in the U.S. or not approved for use in sunscreen applications.

So we have -- you know, it's definitely something that could continue to be tracked, because we have the CAS number information, we have already gathered, you know, historical production volumes, and, you know, whatever is available on-line. So that kind of task -- it's already actually kind of underway. So just behind the scenes, and it's not -- you know, not being -- didn't rise to the top for this particular meeting, but we still have, you know, some preliminary information on chemicals in those classes as well.

MS. HOOVER: And I think actually what I would propose to add on is given the broad interest, I would probably say that instead of even doing the level of depth that we did on this preliminary screen, that we would take

it even at a higher level and try to give more in -- a little bit of information on more classes, just to get a little bit of a broader picture, and then narrow it down, because, you know, these two were pretty easy to pick out, but going to the next layer, I'm not sure. So we could -- we could bring something like that back to you.

PANEL MEMBER McKONE: Right. I mean -- and again, I was not pushing for just zinc and titanium oxide. Just -- I used it as an example. But I think it would be interesting, even at -- just to see some use patterns, like which ones are going up, which ones are going down, because I think it affects where you want to put your resources.

If a certain chemical is really disappearing from the market, it might not be worth doing a lot of effort. I mean, the reason I thought of the oxides is that they're just rising. I mean, everyone recommends them if you go to these websites, oh, these are the best. And that's --

DR. PLUMMER: Well, I think the difference between the -- just to clarify that -- like the ones you're referring to, those are actually -- they have a different way of preventing, you know, skin -- effects to the skin damage, so they physically block. Whereas, these are kind of chemical blockers, so they do -- that is sort of a distinction that is in sunscreens, at least, you

know, physical sunscreens that people use. Those are -- that's kind of a different animal is the -- those physical blockers versus the chemical blockers.

PANEL MEMBER McKONE: Yeah, they both keep UV light from transmitting to the --

DR. PLUMMER: Yeah, in different ways.

PANEL MEMBER McKONE: -- stratum corneum. So it's just how they do it.

DR. PLUMMER: Right, exactly.

PANEL MEMBER McKONE: I mean, they're different binding mechanisms, but they're all effectively blocks of UV light in the sense that they're opaque. You're trying to get something in your skin that is opaque to UV light. And, you know, you can do it many different ways.

MS. HOOVER: I feel compelled to follow up a little because I think what Laurel was pointing to is that the concern -- people are more concerned when you're talking about a chemical -- you know, a chemical, reactive kind of UV stabilizer versus a physical blocker, which is why people are recommending, you know, physical blockers.

Now, I think we could do something like where we -- it's almost like a slightly more developed fact sheet where we look at the different classes and say something about them, and the nature of them, and the kinds of uses. We could start with something like that.

And I'm also kind of inclined -- also following up on something Laurel pointed out that this is old production volume data. I mean, it's a nice idea to say, you know, come back with trends and tell us what's going on -- up and down. You know, we don't have that level of information, so the kind of thing we're talking about now might be better suited to occur after the next set of EPA data come out on import production volume, not for these 2 classes, but for the other classes.

And I want to clarify one other thing, I still want to hear from each Panel member about what they think, so I'm not letting everybody off the hook by not having a formal vote. So we want to hear from everybody.

PANEL MEMBER KAVANAUGH-LYNCH: I think we've talked before that this is a particularly relevant issue to California, not that it's irrelevant in other parts of the country, but I suspect if you had data that you would see that the per capita use of sunscreen in California is quite high in comparison to other states, and therefore makes it -- fits one of our -- the criteria we've chosen.

MS. HOOVER: And I'm going to put you on the spot now. What do you think about these 2? Are you interested in these 2 classes, other classes, what is your opinion?

PANEL MEMBER KAVANAUGH-LYNCH: Well, I have to say from the presentation, the one class is more

convincing than the other class, that it's important to look at.

MS. HOOVER: And which one?

PANEL MEMBER KAVANAUGH-LYNCH: The benzophenones are more convincing.

MS. HOOVER: For you?

PANEL MEMBER KAVANAUGH-LYNCH: Yeah.

MS. HOOVER: Okay.

Dr. Fiehn.

PANEL MEMBER FIEHN: Yeah, it's very hard to recommend any not to investigate, right?

(Laughter.)

PANEL MEMBER FIEHN: So why would we -- why would we possibly do that?

(Laughter.)

MS. HOOVER: Resources, I guess I would say.

PANEL MEMBER FIEHN: I know. I guess, so the question really is do I have a better idea, for a better class?

(Laughter.)

PANEL MEMBER FIEHN: And I do not have any better idea how to use your valuable time.

I do wish, however, if there are already investigations in the chlorinated benzophenones, I'd like to know whether or not these have similarities or not.

Similarities in use, or, you know, so -- because obviously you have already spent some time on those, so I'd like to know more about derivatives also of those classes, I guess.

MS. HOOVER: I guess in my mind by naming benzophenones, we weren't -- we actually were being that broad. But I think it's an important question for us to actually look at the derivatives and see if they're a completely different set of compounds or not. And we just didn't have success yet. We did look at it a bit, but we'll look -- we'll go back to that.

CHAIRPERSON BRADMAN: I think other people have already spoken for me, but I'll just confirm again that I think it's worth spending time on these 2 classes as potential designated chemicals. And I like what's been said here about looking at the other classes.

Some of the most compelling information for me for both of these classes, particularly for the second category is the, you know, presence of these chemicals in breast milk, which means that pregnant women are being exposed and neonates are being exposed, the high detection frequencies for at least one of the compounds, and also just the -- you know, log Kow and the bioconcentration factors are very high for these.

So given that they're fairly common in consumer

products, I think there's a real potential for exposure there, and understanding that would be helpful.

And also just given what we've already seen with BP-3 and the HERMOSA study intervention, it just underscores that that group is potentially important. And particularly, when we get to the -- you know, the final recommendation -- review documents, you know, it may be that the laboratory components may not be that challenging, because they're within the same class.

DR. PLUMMER: And I think the master method that Jianwen showed earlier did include, you know, several of the benzophenones in there. So it seems like that is a promising addition -- or potentially promising addition.

MS. HOOVER: Okay. Well, thank you, Panel. I just wanted to say, is there any more public input about these classes before we move on.

Sorry, go ahead.

PANEL MEMBER QUINTANA: I just wanted to say, I didn't vote yet --

MS. HOOVER: Oh, I'm sorry.

PANEL MEMBER QUINTANA: -- but I vote for putting 2 -- both classes of --

MS. HOOVER: No vote. No vote.

PANEL MEMBER QUINTANA: Yeah -- both classes forward, especially from the persistence, bioaccumulative

and potential, like you said, and lipid soluble and -- in breast milk.

DR. PLUMMER: Thank you.

MS. HOOVER: Okay. So thank you very much, Jenny.

And any public comment about these 2 categories? Any?

Okay, that's it then.

Thank you. So we'll be bringing both classes back and follow up on the other questions that were asked.

CHAIRPERSON BRADMAN: So our next agenda item is going to be a presentation on potential -- our agenda for 2017 for the Scientific Guidance Panel.

And with that, I'd like to introduce Sara Hoover, Chief of the Safer Alternatives Assessment and Biomonitoring Section of OEHHA, who is a real champion of this Program.

So thank you.

(Thereupon an overhead presentation was Presented as follows.)

MS. HOOVER: Okay. I'm just getting my instructions here. Okay. How's that?

Is that loud enough?

Okay. Great.

Advance.

--o0o--

MS. HOOVER: All right. Everything is working.

Okay. So basically, this is -- we always have an item like this as our last meeting -- at our last meeting of the year, because we like -- again, we like to get buy-in from the Panel and the public on what topics we're talking about covering in the coming year.

Some of them will be very obvious to you. We've already foreshadowed that. Our Environmental Justice projects will be a big theme in the coming year, the work that Nerissa described, also the FREES and multi-regional study. So basically, this slide is kind of a summary of what Nerissa has been talking about. And those are topics that we'll be likely to go into more depth.

--o0o--

PANEL MEMBER SCHWARZMAN: There -- this presentation isn't posted.

MS. HOOVER: That's true.

PANEL MEMBER SCHWARZMAN: Is it in here?

MS. HOOVER: No, it's not.

So the -- it was a presentation in flux, because of the nature of what we're covering, and there was some real-time editing going on here. Yeah. So, it's a very brief presentation. It's about 3 slides.

--o0o--

MS. HOOVER: Chemical selection items. We just heard that we're -- you know, from the previous meeting, we're going to follow up on organophosphorus pesticides first, followed by neonicotinoids and, now we're going to be looking at chemicals used in UV applications, specifically the benzophenones and phenolic benzotriazoles to start with, and then doing the tracking as we just discussed.

--o0o--

MS. HOOVER: The other thing, I want to talk a little bit more about it, not all of you may know, but we just passed the 10-year anniversary of the signing of the law that established Biomonitoring California, September 2016. So we've been talking internally as a Program about a way to celebrate and mark that 10-year anniversary.

And we flagged the March SGP meeting in Sacramento to start doing some of that, and take a moment to look at our significant achievements so far, and also look forward for the Program and think about priorities in the next 10 years.

And as part of that, we're thinking of different ideas, and we're very interested in your ideas and the public's ideas about what would be interesting for that. We wanted to make it a different format, a little bit more interactive, so having kind of panel discussions with key

staff and stakeholders who were involved in the Program development.

We're hopping we might be able to actually have a biomonitoring project participant. We'll have to figure out if that's doable for various reasons.

We have some video footage. We have a recruitment video that's been developed. We have other video footage of interviews. So we'd probably do some video element. There's also some very interesting website features under development that -- one of which Nerissa referred to, which is the map feature where we link our -- what we've done so far to different regions of the State, and then, of course, any new biomonitoring results that we'd be ready to talk about at that meeting.

--o0o--

MS. HOOVER: Other special topics. We stay in touch regularly, at least on a quarterly basis, with the Safer Consumer Products Program in DTSC, and we're always interested in keeping in mind collaborative work with that program.

We also are -- as many of you know, OEHHA is embarking on this synthetic turf exposure project, a subcomponent of which will be biomonitoring. And we may have the opportunity to bring to the Panel, and let the SGP comment on, some of the protocols being developed.

A new effort that we're trying to launch, and you know we've always been looking at these things over time, but we want to think about directly applying biomonitoring data, and what we're learning, and what we'll continue to learn about helping evaluate regulatory effectiveness, which is one of the primary goals of the Program. And then I added just this special session on ethics that Dr. Fiehn just proposed.

--o0o--

MS. HOOVER: So that is all the topic areas. You can think about that for a moment, but I did want to surprise Laurel with a little extra thank you, which actually, Shoba developed this slide for me.

And, you know, we all know that she has made herself so essential to the running of the SGP, to the production of the chemical selection documents as you just saw, to the development of improvements of the biomonitoring website. So we're just -- we're trying to stay cheerful.

(Laughter.)

MS. HOOVER: And she's just been a great pleasure to work with. So I did say that she's going to stay in OEHHA. And we're really hoping to, through Laurel, build strong ties with the new program on climate change that she's going to be working on, as well as CalEnviroScreen.

And this is just some screen shots of some of the many documents and work that Laurel has contributed to.

So we really want to wish you very well, Laurel, and then we wanted to give a little shout out to Keena --

(Laughter.)

MS. HOOVER: -- who has provided many cheerful contributions to our teleconference calls over the years.

(Laughter.)

MS. HOOVER: So thanks again, and all the best.

(Applause.)

MS. HOOVER: Then I have a little -- let's see where did I leave it. It's still over there. I have a little present for you. So I'm going to give you that and then we'll go on. Okay. Here you go. Five roses for your 5 years, from my garden.

DR. PLUMMER: Thank you.

(Applause.)

MS. HOOVER: Okay. With that, back to business.

CHAIRPERSON BRADMAN: So we now have some time budgeted for discussion related to the possible agenda items. We also have time for public comment on that. So is there -- Dr. Quintana.

PANEL MEMBER QUINTANA: So I was just thinking more about this topic of environmental justice, because it seemed to me that the California Biomonitoring Program had

different themes. One theme is exposures that we -- it might be significantly -- we don't know about, say in consumer products, like you just -- merchandise, sunscreens. And those aren't particularly environmental justice, except maybe towards people that can afford to buy sunscreen maybe, but they're not that differentially exposed between populations.

Another -- but environmental justice really refers to vulnerable populations, but really differential exposures, and diesel would be one example of that. And so I was just wondering if we should have any more explicit discussion of how resources are split among different issues or -- you know, because should we more explicitly look for differential exposures as a focus? And our role might be to document them, and to document interventions like you were saying that would work, you know, in populations.

And I just wasn't sure if we had this discussion of different themes in the work. And another theme is consumer products versus classical environmental exposures like, you know, trucks or smoke stacks, you know, spewing out stuff, or something that's more -- less under personal control, you know.

MS. HOOVER: Right, right.

PANEL MEMBER QUINTANA: So that would be like a

third area of exposures, say pesticides maybe or something like that.

MS. HOOVER: Well, I think that's a really great proposal. And that fits very well into the March -- you know, some of the March discussions about looking at where we are and where we're going. I think that would be very fitting for that particular discussion.

PANEL MEMBER FIEHN: I would like to see that we, at some point, discuss costs of analytical services. It is important that we not -- that we are able to have limited budgets and do as much as we can for that. And so that might be a -- we have heard today about combining assays, multi-target assays, but there might be more. And I do understand that there was a larger call on exposome studies by the NIH.

And one of the problems was that the State-funded labs, not only California but others as well, were so expensive that they were not chosen for being labs that were conducting such studies. So I'd like to -- at some point, we need to talk about costs and how to look at costs.

MS. HOOVER: Yeah, good proposal.

CHAIRPERSON BRADMAN: You're talking about the CHEAR?

PANEL MEMBER FIEHN: Yes.

CHAIRPERSON BRADMAN: I'm sorry. I just wanted to clarify, that was about the --

PANEL MEMBER FIEHN: Yes.

CHAIRPERSON BRADMAN: -- CHEAR --

PANEL MEMBER FIEHN: Yes.

CHAIRPERSON BRADMAN: -- program through the NIH?

PANEL MEMBER QUINTANA: Being from Southern California, all the talk there is about potentially we're going to start drinking a lot more reclaimed water. And so there has been some discussion of what could be a biomarker of drinking that water. There's some that had been proposed of some of the chemicals that are in reclaimed water or reused water, basically. But I just wonder if that has ever been formally looked at in this program?

MS. HOOVER: You know, I think we have talked about that in the past. I feel like that topic has come up peripherally, and certainly interest in drinking water, so -- or maybe I'm -- you know, I know I've heard about that topic, and it's been of interest, so it's a great idea, you know, to have a -- consider that, and particularly the Southern California focus on issues focused in Southern California. I think it's important. I don't know if -- let's see who else is still here.

And I would like to hear also in terms of -- in

addition to your additional ideas, just any thoughts on what is proposed so far, if -- you know, go ahead.

CHAIRPERSON BRADMAN: Put the slide back up.

MS. HOOVER: Yeah.

PANEL MEMBER QUINTANA: I think I saw -- I'm not sure. Just to make sure I saw the results return. I think that's one of the most successful and innovative pieces of this Program is that results return. It might be nice to feature that. Maybe not just -- maybe you're doing it through the participant, but just to maybe feature --

MS. HOOVER: You mean the 10th anniversary?

PANEL MEMBER QUINTANA: In the 10th anniversary.

MS. HOOVER: That's a great idea.

PANEL MEMBER QUINTANA: Just because it's such a very striking success, people thought, oh, no one can deal with uncertain information, but yeah they can. And it's an important --

MS. HOOVER: Yeah, they can. We did it.

PANEL MEMBER QUINTANA: It's an important point.

MS. HOOVER: So that's a great point and I should say, which I didn't say as part of the slides, the significant achievements so far, one, we've -- we're starting to get an internal committee to work on this. One of the things that Lauren Zeise really wanted was to

have a little report, not a technical report, but sort of a more public, attractive, you know, interesting report.

And we were thinking about trying to identify like our 10 top achievements of the Biomonitoring California, which is something that actually George Alexeeff had us do within OEHHA. So results return was on my list for sure. So that would be featured in a report like that.

PANEL MEMBER McKONE: This is a thought about the 10th anniversary. I don't know how much we planned, but --

MS. HOOVER: We are just starting next week planning, so all ideas welcome.

PANEL MEMBER McKONE: You know, rather than -- so we'll have a regular meeting, but I don't know how possible it is to have a half day after or before.

MS. HOOVER: Yeah. It's not going to be a regular meeting. It's going to be a shorter meeting.

PANEL MEMBER McKONE: So I mean -- but it will be tied to our regular meeting?

MS. HOOVER: Sorry?

PANEL MEMBER McKONE: No, but I was saying if it's with our regular meeting --

MS. HOOVER: Yes.

PANEL MEMBER McKONE: -- it would be one day

before or after, so people could stay over. And you're going to invite in -- I mean, it's going to be separate from the Guidance Panel meeting.

MS. HOOVER: No, we were thinking of a coordinated -- just a different animal of an SGP meeting, but still --

PANEL MEMBER McKONE: Oh, oh. So it wouldn't be -- we won't have to do our regular work then?

(Laughter.)

MS. HOOVER: I'm not going to agree with that statement --

(Laughter.)

MS. HOOVER: -- because there's going to be plenty of input from the Panel --

PANEL MEMBER McKONE: Right, right. Well, the question is --

MS. HOOVER: -- like on some of the issues that Jenny just highlighted.

PANEL MEMBER McKONE: You know, so my point is we may feel really rushed or we may give short change to this and that, if we try to have a regular meeting and a celebration, so long as we're going to be --

MS. HOOVER: No, it's going to be planned to not give short shrift.

PANEL MEMBER McKONE: Okay.

MS. HOOVER: And any Panel input item would be, you know, enough time allotted for the Panel input. But the idea is to have a different kind of a meeting, and take a moment to mark this event.

PANEL MEMBER McKONE: Are you going to bring in like a brief keynote speaker or something? Maybe for lunch, instead of going out to eat, we could --

MS. HOOVER: All ideas welcome.

PANEL MEMBER McKONE: That's great. I think it would be really useful --

MS. HOOVER: Nothing -- you know, I haven't even written the agenda, you know, on the paper yet. So it's all wide open.

PANEL MEMBER McKONE: Get some big name to get an inspirational speech.

MS. HOOVER: Well, I mean, I think that the idea we had around that is inviting, you know, key people who have been involved in the legislation, like historical figures coming back, and not necessarily a lot of talks and presentations, but a little bit more interactive and multi-media, and that kind of thing. So that's the idea, but if you have any keynote speaker in mind, shoot me your ideas by email.

PANEL MEMBER QUINTANA: I just -- my understanding was this whole Program came about largely

because of activism by the breast cancer community, is that correct? And if so, it would be nice to bring it back to feature some of the breast cancer work.

MS. HOOVER: Well, yeah, that's why we're saying like some of the key staff and stakeholders who were -- and actually, another, you know, key person who got us across the finish line was Joan Denton, former director of OEHHA. She played a huge role in moving the Program forward. So definitely -- you know, we actually had a little tiny internal celebration at one of our program meetings.

And we were looking at old documents, you know, and like all the work that went in long -- before the bill was signed as well. So, yeah, we're trying to take a moment and just look at how that was pulled off and where we are.

CHAIRPERSON BRADMAN: Can you put the slide up on the agenda item.

MS. HOOVER: These are all potential agenda items.

CHAIRPERSON BRADMAN: Right, no, but there was --

MS. HOOVER: Which one?

Asa, microphone.

CHAIRPERSON BRADMAN: I'm sorry. I think it was the one just before this.

MS. HOOVER: The one just before that is the cover slide.

CHAIRPERSON BRADMAN: Okay. So I think it was this one.

MS. HOOVER: Yeah, this is just -- you know, I mean, we typically do where we pick and feature a particular project and go into depth. We have a lot to choose from now. So actually it would be helpful to hear if there's a particular study you'd want a longer discussion of. Some of that environmental justice will still be in the development stages.

CHAIRPERSON BRADMAN: Right. I think that's an area where I'd like to see some more discussion.

MS. HOOVER: Yeah.

CHAIRPERSON BRADMAN: So there's not much more to say than that, but we've touched on it at the last meeting and earlier today.

MS. HOOVER: Yeah.

CHAIRPERSON BRADMAN: And I think that's something where we can have more outreach. And again, if we could perhaps diversify the geographic distribution of groups and people that are providing input to the Program.

MS. HOOVER: Yeah.

CHAIRPERSON BRADMAN: I know one time we talked about possibly a meeting in Southern California, which

would be expensive, and difficult for most of us. I know, some of us already come up from Southern California.

(Laughter.)

CHAIRPERSON BRADMAN: And, in fact, I've noticed that people missing today are from Southern California, but --

MS. HOOVER: I don't think that's because of Southern California. It was various reasons why they couldn't make it.

CHAIRPERSON BRADMAN: Okay.

MS. HOOVER: Yeah.

CHAIRPERSON BRADMAN: But, you know, if -- we could kind of extend -- again, extend that kind of geographic outreach. That's something to consider.

PANEL MEMBER QUINTANA: Yeah. I think especially the Central Valley feels overlooked, Imperial Valley and Central Valley. So not just San Diego, L.A., San Francisco, but --

CHAIRPERSON BRADMAN: Right.

MS. HOOVER: Overlooked in terms of people visiting --

PANEL MEMBER QUINTANA: Some of the -- to real -- overlooked in terms of, you know, being -- feeling part of these projects that are going on, and people come there and present their work. And, you know, I just think it's

important to --

MS. HOOVER: You mean, so geographically going to the region.

PANEL MEMBER QUINTANA: Geographically going to that region --

MS. HOOVER: Yeah, yeah.

PANEL MEMBER QUINTANA: -- with information, making it easy for locals to come, you know, and have their say.

MS. HOOVER: Yeah. And, you know, I mean, I know we don't want to talk about resources, but the reality is, you know, we just don't have the travel budget to do that. We don't really have a travel budget for this Program within OEHHA. We just, you know, have a small piece of, you know, that we use. And so we've been really efficient.

And we also did try, at one point, having a -- you know, the conference call where we made Panel members available in Southern California and elsewhere. And that was logistically nightmare-ish, and didn't improve -- it didn't improve turn-out.

But I do think -- I mean, I think that what you're saying, and what I hear you saying, and I think we're embarking on, is a different sort of a meeting. You know, not an SGP meeting, but community meetings. And

like Nerissa said, that is part of the outreach. It's actually going to these places. And we've been making contact with these organizations. And like when we talked to LA PSR, they offered to like host a community session. So that's definitely the thinking going forward.

PANEL MEMBER QUINTANA: Can I say something else?

PANEL MEMBER KAVANAUGH-LYNCH: I'm having some thoughts that I'm hesitating about bringing up, but clearly I've changed my mind about that.

So in terms of a 10-year celebration, I fully understand the looking back and recognizing the people who were instrumental in getting us here today, but I would maybe suggest a looking forward to what's the potential for the Program, what can we do as more of an emphasis?

MS. HOOVER: Definitely. And that's -- yeah, that's paired. Yeah, so there's a little bit of a marking, but a big part is looking forward, yeah.

PANEL MEMBER KAVANAUGH-LYNCH: Yeah. And I think we've talked before, and I am politically unsavvy at best. But thinking about ways to get noticed. I believe we've talked in the past about getting some of our political leadership involved, and possibly even biomonitored, and, you know, getting legislators from around these key places in the State that we can't go visit, but we know where they all are, and getting them biomonitored and returning

the results to them in a public meeting, I think, would get a whole lot more recognition than a different flavor of SGP meeting.

MS. HOOVER: Yeah. You know, we had a project planned. We had it all set up. We had it scheduled. We had the phlebotomists, and so that was -- that was a plan, and it was not -- we didn't get it approved.

So I don't -- not within OEHHA. OEHHA was fully on board. I'm going to have to speak up for OEHHA, and otherwise I am not going to say how it was shot down. However, you know, leadership has changed, and attitudes have changed, and so I think, you know, we could see again if that might be an option.

PANEL MEMBER FIEHN: Including the illicit drugs.

(Laughter.)

MS. HOOVER: Okay.

(Laughter.)

CHAIRPERSON BRADMAN: Yeah, that's fine, and then we have public comment that we'll get to.

Go ahead.

PANEL MEMBER QUINTANA: I just -- in terms of the agenda items for next year, I just remembered about something I'd asked about a go or two, and I was just going to ask for an update. One, is that there was a paper that came out in EHP on new exposure of biomarkers

as tools for breast cancer epidemiology, biomonitoring prevention, a systematic approach based on animal evidence.

And I think I had asked back then how many of those proposed chemicals of concern, through the animal literature had -- were in our Program or --

MS. HOOVER: Yeah. I mean, I -- I'm very familiar with that paper. I've looked at it, and I think I -- I think we should set up a conversation off-line, and I can just give you the feedback directly, and then we'll see -- we can maybe form a topic that we'd bring to the Panel, but let me talk to you about it off-line.

CHAIRPERSON BRADMAN: So we have one public comment to wrap-up. I don't -- again, I don't -- any comments through email or --

MS. DUNN: No.

CHAIRPERSON BRADMAN: No. Okay. So --

DR. SINGLA: Hello. Veena Singla with Natural Resources Defense Council. And I think it's great that the Program has been coordinating with the Safer Consumer Products Program, and supporting each other's work. And I would echo one of Dr. Bradman's suggestions from the beginning of the meeting, in terms of trying to coordinate the work with other priorities, going on in within CalEPA and DPH as well, in terms of thinking about some of the

environmental justice work, because I think that's -- that would be a great way to kind of leverage and -- to leverage limited resources and have the results also have the most impact as well.

And in regards to the 10-year anniversary celebration, I think kind of in terms of kind of getting some of the attention that was under discussion, it would be helpful if the report to the legislature was prepared in time for the -- this meeting. I think that would be a great way to update the legislature as to what the recent Program accomplishments have been.

MS. HOOVER: I will comment on the first part of that, and I'll see if anyone wants to give an update on -- the leg report is still -- still in review, as you probably know.

I will say there's a lot of activities that have been going on. We've been really, really busy. And I'll just mention another really interesting environmental justice thing we've been doing, which is we've been in touch with Ana Mascareñas and we've been -- we had -- I had a meeting with her. Nerissa and I are going to meet with her. So that's another kind of coordination we're going to try to do going forward.

And then I'll say another pieces, which is Gail Krowech, who's retired, and hopefully soon to be a retired

annuitant. We're going to have her revisit the work that she did many years ago at the beginning of the Program, where she went and reached out to different organizations -- or agencies -- government agencies to survey them about issues of concern, emerging issues. So we're going to revisit that work with her leading the way.

DR. WU: I am sorry that I don't have an update on the 2016 legislative report the Program put together and submitted at the beginning of the year. We have gotten some comments back internally, which means that at least it's moving. And hopefully it will be out by March, but there's no way for us to predict when that will be. Even by the time it comes out, that will be out of date, unfortunately.

I think we have plans for a number of different communication methods that we can use, in lieu of an updated legislative report that won't go through the same level of scrutiny and delay. And so hopefully, we'll be able to highlight some of the updated status of our project through these -- the different media, the newsletter, the report that Lauren Zeise has talked about, and other means.

CHAIRPERSON BRADMAN: I just want to also highlight one topic that we haven't really talked about too much today, but is, in general, on our agenda around

pesticide biomonitoring. Actually, just last week, a week ago yesterday, we had a meeting at CHAMACOS with the Ag Commissioners from Santa Cruz and Monterey County, and also Brian Leahy, and staff from DPR.

And there's just a lot of issues going around in the State right now around pesticide use in their schools near homes. And there was definitely, you know, interest in more biomonitoring around pesticide exposures, so that should -- it's on our agenda, but we should keep thinking about it.

MS. HOOVER: Yeah, and I'll just add that the only thing I showed up here was organophosphorus pesticides, but we're planning to again have like a pesticide theme when we cover. So that we would invite, you know, some external guest speakers. And I'll definitely be talking with you about that.

Okay. Well, that's great input. And again, everyone in the public, and if -- you can feel free to email us any other ideas or issues of concern.

And back to you, Asa.

CHAIRPERSON BRADMAN: So I think that, at this point, we're ready to close the meeting.

We do have a period of open public comment on any topic related today. I think we've probably covered that in the last comment.

But if there's anyone who has a last-minute comment, let us know?

Otherwise, we're going to proceed with our wrap-up and adjournment for today. A transcript of this meeting will be posted on the Biomonitoring California website with -- when it's available.

Our next Scientific Guidance Panel meeting is going to be on March 8th, 2017, in Sacramento.

And Leah Bumalay -- I hope I'm pronouncing that correctly -- of OEHHA will be in touch soon to pull dates for other 2017 meetings in July and November. If you're already aware of constraints on your schedule -- this is for Panel members and others as well -- for those months, please let Sara Hoover know.

And then I just want to thank the Panel today for a great discussion and the audience for the discussions today. And we can now formally adjourn the meeting.

Thank you.

(Thereupon the California Environmental Contaminant Biomonitoring Program, Scientific Guidance Panel meeting adjourned at 4:14 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, 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 17th day of November, 2016.

JAMES F. PETERS, CSR
Certified Shorthand Reporter
License No. 10063