CALIFORNIA ENVIRONMENTAL CONTAMINANT BIOMONITORING PROGRAM

(BIOMONITORING CALIFORNIA)

SCIENTIFIC GUIDANCE PANEL MEETING

CONVENED BY:

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

STATE OF CALIFORNIA

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

RICHMOND CAMPUS AUDITORIUM

850 MARINA BAY PARKWAY

RICHMOND, CALIFORNIA

THURSDAY, NOVEMBER 8, 2018

10:31 A.M.

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

PANEL MEMBERS:

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

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

Oliver Fiehn, Ph.D.

Eunha Hoh, Ph.D., M.S.E.S.

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

Thomas McKone, Ph.D.

Veena Singla, Ph.D.

José R. Suárez, M.D., Ph.D., M.P.H.

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Lauren Zeise, Ph.D., Director

Russ Bartlett, M.P.H., Senior Environmental Scientist

Sara Hoover, M.S., Chief, Safer Alternatives Assessment and Biomonitoring Section, Reproductive and Cancer Hazard Assessment Branch

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH:

Lauren Baehner, M.P.H., Research Scientist II, Exposure Assessment Section, Environmental Health Investigations Branch

Jennifer Mann, Ph.D., Research Scientist IV, Exposure Assessment Section, Environmental Health Investigations Branch

Jed Waldman, Ph.D., Chief, Environmental Health Laboratory

Nerissa Wu, Ph.D., Chief, Exposure Assessment Section, Environmental Health Investigations Branch

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

GUEST SPEAKERS:

Katie Butler, M.P.H., D.A.B.T., Senior Staff Analyst, Los Angeles County Department of Public Health

Sara Cody, M.D., Health Officer, Santa Clara County

Karen Cohn, M.S., C.I.H., Program Manager, Children's Environmental Health Promotion Program, San Francisco Department of Public Health

ALSO PRESENT:

Ms. Ludmilla Bade

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

MR. BARTLETT: We're going to begin the meeting shortly. Before we start, today's meeting is available via webinar, so please speak directly into the microphone and introduce yourself before speaking. This is for the benefit of the transcriber as well as those participating on the webinar. For those of you listening via the webinar, please make sure you microphones are muted for the entirety of the meeting.

The materials for the meeting were provided to SGP members and posted on the Biomonitoring California website. A small number of copies of the meeting materials are available at the table near the entrance to the auditorium.

We'll take a break at 1:25 p.m. for lunch, and take another short break at about 3:20. And the restrooms are located at the opposite end of the hall from where we are now on either side. In case of an emergency, we have exits here in the front on either side. As you exit the emergency door, immediately turn to the right and then to the left.

I'd now like to introduce Lauren Zeise, Director of the Office of Environmental Health Hazard Assessment.

DIRECTOR ZEISE: Thank you, Russ.

Good morning. I'd like to welcome the panel and

the audience to this meeting of the Scientific Guidance Panel for the California Environmental Contaminant Biomonitoring Program, also known as Biomonitoring California.

So thank you all for participating and sharing your expertise. The Panel last met on August 22nd. The Panel heard about ongoing program activities, and we had a very detailed look at biomonitoring results that we have so far on per- and poly-fluorinated substances, the PFAS chemicals. The meeting discussed measuring PFAS chemical exposures in the context of drinking water, consumer products, intervention studies. And we also discussed approaches to track PFAS chemicals, and to expand the number of chemicals monitored in the environment and biomonitored.

So we've posted a summary of our discussion and recommendations for the Program from that meeting, along with the complete transcript at biomonitoring.ca.gov.

So the theme of today's meeting is community exposures to metals. We're looking forward to exploring some interesting findings on metals from our -- from two program studies, and also having a rich discussion with our guests from county health departments in Northern and Southern California.

So before turning the meeting over to our Panel

Chair, Meg Schwarzman, I'd like to first acknowledge Dr. Marion Kavanaugh-Lynch, who served as a member of the Scientific Guidance Panel since its inception serving for more than ten years. While she's not here today, we wish her well as she continues in her role as Director of the California Breast Cancer Research Program, where she develops strategies and guides priorities for California's substantial investment in breast cancer prevention and treatment research.

So, now what I'd like to do is have you join in welcoming our newest Panel Member, Eunha Hoh, who was appointed by the Speaker of the Assembly. Eunha is a professor of Environmental Health in the School of Public Health at San Diego State University. Her research focuses on diverse environmental chemicals and their impact on human and ocean health.

Chemicals include brominated and chlorinated flame retardants, polycyclic aromatic hydrocarbons, and components of third-hand tobacco smoke.

Eunha also investigates emerging chemicals and has developed a novel non-targeted analytic approach for detecting a broad range of organic chemicals in various types of environmental matrices. She holds a Ph.D. in Environmental Science from Indiana University.

So welcome, Eunha.

Now, I'm going to administer the oath of office to you. And so if you'd like to stand and raise your right hand, and repeat after me.

I --

PANEL MEMBER HOH: I --

DIRECTOR ZEISE: -- state your name --

PANEL MEMBER HOH: Eunha Hoh

DIRECTOR ZEISE: -- do solemnly swear --

PANEL MEMBER HOH: -- do solemnly swear --

DIRECTOR ZEISE: -- that I will support and defend --

PANEL MEMBER HOH: -- that I will support and defend --

DIRECTOR ZEISE: -- the Constitution of the United States --

PANEL MEMBER HOH: -- the Constitution of the United States --

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

PANEL MEMBER HOH: -- and the Constitution of the State of California --

DIRECTOR ZEISE: -- against all enemies foreign and domestic --

PANEL MEMBER HOH: -- against all enemies foreign and domestic --

DIRECTOR ZEISE: -- that I will bear truth faith and allegiance --

PANEL MEMBER HOH: -- that I will bear truth faith allegiance --

DIRECTOR ZEISE: -- to the Constitution of the United States --

PANEL MEMBER HOH: -- the Constitution of the United States --

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

PANEL MEMBER HOH: -- to the Constitution of the State of California --

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

PANEL MEMBER HOH: -- that I take the obligation freely --

DIRECTOR ZEISE: -- without any mental reservation --

PANEL MEMBER HOH: -- without any mental reservation --

DIRECTOR ZEISE: -- or preponderance of evasion --

PANEL MEMBER HOH: -- or purpose of evasion --

DIRECTOR ZEISE: -- and that I will well and faithfully discharge the duties --

PANEL MEMBER HOH: -- and that I will well and faithfully discharge the duties --

DIRECTOR ZEISE: -- upon which I am about to enter --

PANEL MEMBER HOH: -- upon which I am about to enter.

DIRECTOR ZEISE: Welcome to the Panel.

PANEL MEMBER HOH: Thank you.

(Applause.)

DIRECTOR ZEISE: All right. Now I'll turn the meeting over to Meg Schwarzman.

CHAIRPERSON SCHWARZMAN: Is that okay.

Good. Thank you so much, Lauren. And welcome, Eunha. Glad to have you.

I want to, as usual, announce the goals for today's meeting. As Lauren mentioned, we're focused on community exposures to metals. So this morning, we will hear a Program update, followed by California Biomonitoring staff who will present findings on metals from two studies, the BEST Study, Biomonitoring Exposures Study, and the Asian/Pacific Islander Community Exposures Project, or the ACE Project, which we've discussed at various times on this Panel. We'll have time for questions and Panel and audience discussion before we break for lunch.

Then in the afternoon, we're going to start with remarks from our guest discussants who are here with us from several county health departments. And they will share their experiences addressing community concerns and questions about environmental contaminants, including metals. And the major goal of that discussion will be to look at how to engage with communities about biomonitoring results, and what we should do to follow-up from those results.

We'll also look for possible ways that Biomonitoring California can share their expertise and collaborate with county health department -- departments on these topics.

And then to wrap-up today's meeting, we'll hear about some possible topics for the 2019 meetings, and have time as usual for open public comment.

So we won't, as in the last meeting or two, be using the comment cards, because it helps facilitate a more free-flowing discussion period. If you want to speak during the question or discussion periods, you can come to the podium or raise your hand. And I will be looking out and Sara will be looking out, and others will be. So we'll call on you at an appropriate moment in sort of the flow of conversation.

And for the benefit of the transcriber, please

clearly identify yourself before providing your comments and write your name and affiliation on the sign-in sheet, so that he can use that as check against what you say, just to get your name right.

So if you're joing the meeting via webinar, you can provide comments via email biomonitoring@oehha.ca.gov. That's O-e-h-h-a dot C-a dot gov. And relevant comments will be read allowed, paraphrasing them if necessary, if they're long.

So please keep your comments brief and focused to the items under discussion. And if we need to, we'll impose time limits, but we'll see how the discussion goes. So I want to start the rest of -- the body of the meeting by introducing Nerissa Wu. She is Chief of the Exposure Assessment Section in the Environmental Health Investigations Branch, EHIB, at the California Department of Public Health and overall lead for Biomonitoring California and she'll provide an update on current program activities.

(Thereupon an overhead presentation was presented as follows.)

DR. WU: Does that work?

(Yes.)

DR. WU: Okay. Hi, everyone. Good morning and thanks everyone for being here, for those of you joining

us on the phone, and welcome, Dr. Hoh. Very nice to have you here with us.

I am going to start off with a few project updates, and then I'm going to turn to some thoughts about program directions and priorities.

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DR. WU: So last time we were here, I summarized the recruitment efforts and study enrollment for the first region of the California Regional Exposure Study, which started off in Los Angeles.

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DR. WU: And here's where we are now. As we discussed, we have 430 participants who enrolled in Los Angeles. At this point, we have finished our early notification calls. And those are calls that go out to participants who have an elevated arsenic, cadmium, lead, or mercury level. And actually later this morning, we'll be going into a little more detail about that protocol, why and how we do early notification calls. So I'm not going to dwell on it, but just to say that of the 430 participants in Los Angeles, 66 of them did receive an early notification call.

We have lab results for all of our L.A. participants from our labs for metals and for the per and polyfluoroalkyl substances, the PFASs. Everyone in the

study got those analytes. And then we also selected a subset of participants, 160 people who will have an analysis for 1-nitropyrene, the biomarker of diesel exposure. And we sent those samples out to Chris Simpson at the University of Washington who has presented to this Panel before.

That data is also available to us. We're in the process of going through it, cleaning it up, and getting it ready for results return. And we'll be -- we'll be getting those packets out in January 2019.

We were not able to complete our phenols analysis on time for this packet. We have a subset of 60 to 100 participants who will also get phenols analyses, but we hope to do a second round of results return in the spring with those.

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DR. WU: And for those of you who have not seen one of our results return packets before, I have one, on the phone. I am holding up a packet. Sorry you can't see it. The packet includes a cover letter reminding participants that they signed up for the study, what it's about. And then we have a two-pager, which goes into some frequently asked questions, what do I do with these results, how do I interpret them, how do I get more information on this?

And then we have individual results, which also include some comparisons to numbers from the study, as well as some NHANES numbers.

MR. BARTLETT: Can you fast forward.

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DR. WU: There we go.

Okay. And for each chemical that we return, there's also a chemical fact sheet that accompanies it, where are places that I might have become exposed, what can I do to reduce my exposure. And even though this packet is something that we've put together a number of times and we've gone through this process, it's always very involved. We have a lot of text to convey complicated information to a lay audience. So there's been a lot of work that goes into these packets over time.

And every time when we're updating them for any study, it's still a lot of work to put them together. With 430 participants, it's also a logistical challenge getting the packets created, and have them go through a lot of QA review to make sure they're all correct, and then out the door. So it's kind of all hands on deck for the next couple of months getting that done.

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DR. WU: With results return for Region 1 underway, we're now turning our attention to Region 2.

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DR. WU: And as we discussed last time, Region 2 includes Riverside, San Bernardino, Imperial, Mono, and Inyo counties. And this slide just has some very basic demographic information on those counties, much lower population than L.A. county, less racially diverse. There's a considerable percentage of non-English speakers, predominantly Spanish. So these are some things that we have to think about as we prepare our outreach and recruitment strategies.

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DR. WU: Our sampling goals are going to reflect the population from the different counties with the great majority of samples coming from the urban core of Riverside and San Bernardino counties, indicated here as Zones A and B. There's also this ring, the suburban and urban areas surrounding that urban core. That's Zone C. And then, of course, Imperial, and Inyo, and Mono counties have a much lower population and that is reflected here in our sampling goals.

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DR. WU: We have a new postcard that has been designed to go out to randomly selected households. And there have been a lot of changes made to this postcard since Region 1. We heard back from focus groups. We

heard back from this Panel, and from some of our participants. And so we've tried to include more information to address their concerns, things like more information on what CARE is, what will I get from it, eligibility criteria, the incentive is prominently displayed, and having our contact information highlighted. Those are some things our focus group asked us to do. And so we've made that adjustment.

Again, it's always a balance. We want to include all the information people want without making the postcard very dense and unreadable. Everyone has gotten lots of postcards over the last couple of months. I'm sure they're all burned out from that. Hopefully, by January, when this goes out, they will be fresh and ready for reading a new postcard.

(Laughter.)

DR. WU: The postcard rate of response from L.A. was low. It was less than one percent as you might expect from something in the mail, but it was still a significant source of participants. And in this region which is much less densely populated, and there are many fewer community organizations, this might actually be a better way to reach out to the population. And that is one of the things we'll be looking at in our evaluation.

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DR. WU: So this is what our calendar looks like for the next year: Getting our results return out for L.A., that's in January; conducting outreach; getting our field office set up; then we'll be in the field in Region 2 from January to May. During that time, we'll get our second results return packet out for L.A. for phenols. And then we're preparing to have some community meetings in collaboration with our community partners in the spring in Los Angeles.

After that, we'll be wrapping up in the field in Region 2. Then they'll have early notification, data processing, and getting ready for results return for Region 2, while we're starting to look forward to Region 3 and doing outreach. And Region 3 will be in San Diego and Orange County.

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DR. WU: So now I am going to change directions and talk about the Foam Replacement Environmental Exposure Study. This is something that was initiated in 2015, and we have not talked about too much here. We did this project in conjunction with UC Davis, who has the Couch and Foam Cushioning Replacement Study, and a sister project the Foam Furniture Replacement Study in San Jose.

And they have 39 households, for which a house -- a baseline dust sample was collected in the households.

And then the households went and replaced or removed foam furnishings. And replacements were made with non-flame retardant options. And this was made possible, of course, by Technical Bulletin 117, which was amended in 2013 to require labeling of household furniture to indicate if products contained flame retardant chemicals.

So the study team then returned at six, 12, and 18 months after the couch was replaced, and dust was collected again at those time points. So for the FREES Study, we recruited participants from the UC Davis study participants for a biomonitoring component. And we went out to collect blood and urine Samples at the same time points.

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DR. WU: The timeline for this project was elongated somewhat. We started recruitment in 2015. But between the time that it took to recruit participants and then the time participants took to replace their sofa, the six-month point ended up stretching out over a full year. And so instead of collecting our final samples in 2017, as anticipated, we were collecting samples until the spring of 2018.

And this is actually something we talked about a little bit last time with intervention studies, this is an intervention study for which the intervention was

completely out of control of the study team, and we were actually asking people to do something fairly significant. If you've gone sofa shopping you know that there's a lot of things you have to consider, not just the flame retardancy of your coach.

So it took people a little while to do that. And then we followed them for such an extended period of time, that this was quite a long commitment for the participants. We did lose some people to follow up during the process of the study. We started out with 28 participants representing 18 households, and we ended up with 22.

We do have all the results of blood and urine analysis at this point. And the results return packets went out in October of this year. So everyone should have their biomonitoring data.

The dust data from UC Davis is in the process of being prepared for results return, and hopefully will becoming out by the spring. And then we are planning to hold a participant meeting to talk about those results. We are also really looking forward to diving into the data to look at things like flame retardant levels, biological levels over time, comparing the biomonitoring data with the dust data. And, of course, we also have some foam samples from a subset of the homes, both the old furniture

that was replaced, but also some of the new furniture, because we want to verify compliance with those labels, so that will help illustrate some of the -- some of the data analysis that we do.

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DR. WU: And this is a third study in the works, East Bay Diesel Exposure Project. And this was initiated in 2017 to look at parent-child pairs in the East Bay. Fifty -- Fifty households each, 50 parent and child pairs at two time points each. And this study was designed to allow for comparison of diesel exposure within households, across age groups, across communities, and across time.

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DR. WU: So the project team has been very busy enrolling participants in the study. Participants are from across the East Bay from Hercules to San Leandro with a focus on Richmond and Oakland. And the initial project protocol included daily sampling in five household pairs to get a look at variability over a one-week time period, which is -- it's a pretty big ask of participants to take that many samples. But amazingly, many more people than anticipated were willing to participate in this intensive urine collection. So there are now 15 households who are participating in the daily sampling protocol. So the data that comes out of that I think will be very interesting to

look at.

But to adjust for the total number of samples that can be included in the study, the overall number of participants has been reduced to 45, though the total number of samples in the study remains the same.

So recruitment and sampling is ongoing. It will end next month, December 2018, and results return and community events are planned for 2019.

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DR. WU: Here is our dreaded program budget slide, with which you are all familiar. We are here in '18-'19, where we have just the State baseline funding and we are in our last year of the CDC cooperative agreement. And, of course, the cooperative agreement may continue in on the future, but it is uncertain whether or not we'll be awarded another cooperative agreement, and also how much funding will be available from the CDC.

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DR. WU: So like anyone else living on a budget, we have to maximize our impact within that budget. And so it's important for us, as a Program, to keep an eye on what are our are priorities, how can we best impact public health with our means?

This prioritization helps inform our study design, and our questionnaires, and the lab panels that we

choose to maintain. So we do periodically internally revisit this question of what is important to us, what are our priorities? And we continue to identify statewide surveillance, environmental justice, and chemicals in consumer products as our top priorities.

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DR. WU: We do include stakeholder input in this discussion. We've talked about the listening sessions that we held across the state, funded by the stakeholder bill of fiscal career '16-'17 to learn more about community groups and what their priorities are and how biomonitoring can best help them, and -- issues, air pollutants, drinking water pollutants, pesticides were all universal concerns across the state.

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DR. WU: And any discussion of our priorities really has to include consideration of our founding legislation as well, which mandates some of our activities. Legislation specifically names statewide surveillance as a priority. Community-based surveys are mentioned as a task, but only contingent on resources. So that is -- that's something that we need to consider.

The legislation doesn't really provide details on how statewide surveillance will be conducted, but there are certain aspects of biomonitoring that are mandated,

such as the communication of our findings, and that's something we do spend a lot of time doing. Also, the conducting of statistical and epi analysis of our biomonitoring results.

And there's also a requirement that we provide guidance to other biomonitoring programs, which I think is one of the ways in which our program has value, and provides a lot of value to the scientific community at large.

There's many important issues for us to study. There's so many communities that are concerned with chemical exposure and want to be biomonitored, and our list of chemicals of concern is actually getting longer and not shorter. And we are really frequently asked to be part of studies, which we often cannot take on. But the question remains how can we best serve biomonitoring and public health within our means.

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DR. WU: So even though we do talk about community studies and statewide surveillance as an either/or situation, or as sort of dichotomy, the CARE study is actually a resource for community-based studies, whether or not we conduct those community-based investigations or some other entity does. The CARE study will provide useful data, which can be used in comparison,

and may also generate hypotheses for researchers. And one of the things we're committed to is getting data posted as quickly as possible, so that it can be used in a timely manner.

With the resources we have, we also can contribute to projects and biomonitoring overall through our expertise in designing questionnaires and study design. We do share questionnaires with other researchers across states and within California, and we'll continue to do so. And I believe the ACE questionnaire has just been posted on our Biomonitoring website, so it is accessible to others to take a look at.

We have our lab expertise. And the big challenge with a lab, of course, is that there are lots of chemical panels of interest and of concern, but we're really not set up as a commercial lab. And with our budget, we have a lot of trouble maintaining instruments and staff, so it can be difficult for us to participate in other studies. We have trouble meeting project deadlines, if we can't control our own budget.

So even though it's important to develop new methods and cover many different panels, I think, as a Program in some ways, we really need to specialize and focus on fewer panels, so that we have a robust lab method that's reliable for certain lab panels. But the question

is what are those priorities, and we could really use some input, how do we prioritize lab panels to maintain.

And finally, results return materials, which I've already talked about that we do share with many other states and researchers, both the content and the language that we've worked on quite a bit, but also the process that we go through to prepare those packets.

So again, I would open this up when we have our discussion to panelists and to advocates and other researchers, are there other ways that we can be helpful as a program with -- given what we have as resources right now?

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DR. WU: And while I do think there is a lot of value to what we're currently able to accomplish, I think there is a lot more we could do to fulfill the promise and the potential of our program. And we were asked a few months ago by this Panel about what we would like to be able to do if we had the resources, kind of a programmatic wish list.

Well, given the potential for CARE, one of our primary items on our wish list really is to be able to condense the timeline of the study. We're currently able to do one region per year. And so we introduce some temporal bias. And it takes a long time to get across the

state. And we would like to be able to condense this into a four-year cycle, or ideally a two-year cycle, which is what the original vision of the Program was. But this would require much more staff, not only in the field, but also in the lab, much more equipment to run those samples.

And when the Program -- just to give a sense of where we are as a Program compared to our initial vision. Our budget is about 1/7th or 1/8th of our -- the current -- of the budget that was envisioned for the Program, so that gives you an idea of the relative cost of expediting the CARE Study.

We'd like to be able to design and implement additional smaller studies, substudies, to look at impacted communities, to examine specific public health impacts or regulatory questions. We'd like to be able to do intervention studies maybe nested within CARE, or look at multiple samples per participant to look at some of that variability and exposures.

And beyond CARE funding, I know we say this often, but stable funding for the labs really is critical so that those lab methods can be maintained and available, not only for our work, but for other research -- researchers to take advantage of. And given the importance of semi- and non-targeted screening, and the fact that this funding from CDC can't be used for this

kind of work, it is really important for us to get stable State funding to support that kind of work.

We'd also really like to be able to respond to emergency events, like wildfires and other natural disasters, and also respond to some of the community requests regarding specific exposure sources that come to us.

And finally, one of the things that we have not been able to do as much of as a program is delving further into our data than we already do. Our staff is quite occupied with conducting the front end of studies. And so it often takes quite awhile for us to really get into all the data we collect. And we have piles of data, which would be very interesting to analyze.

So for those of you who have doctoral students who are curious, and smart, and looking for a project, send them our way, because I think that's one way to build the capacity of public health overall, but also to get our data out into the public more quickly.

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DR. WU: And just to thank our existing staff. They amaze me every day, because they are the ones working with the limited resources and managing to be very, very productive.

And with that, I will turn it back to the Panel.

CHAIRPERSON SCHWARZMAN: Thank you so much, Nerissa. We'll start with questions for Nerissa from the Panel.

PANEL MEMBER McKONE: Tom McKone. On budgets, I mean, it is the core --

THE COURT REPORTER: Get closer to the mic.

MS. HOOVER: Get closer.

PANEL MEMBER McKONE: Oh, sorry. A lot -- there's a lot of good ideas out there, but I was -- the question I have is are there other opportunities that might be pursued to sort of fill the rest of that gap or even move it back up, for example. I know the CDC you're working -- you can't say it's certain, but looking on the horizon.

Are there other possibilities with foundations? And I know I historically, there was money from other State programs that had an interest. For example, one of the things I'm thinking of there's a lot of efforts, both in the state and other areas to sub -- do chemical substitution. So it's like, I guess, the FREES study. That's a very interesting study about substitution of flame retardants.

But there's a lot of activity -- you know, I was at a conference last week, and Meg was there also, on alternatives. And DTSC -- sorry, the Department of Toxic

Substances Control is quite interested in pushing chemical alternatives. I would think maybe they or somebody else in the industry would be interested in the monitoring what happens when you start pushing alternatives, more studies of that type.

And I think there might be a source of funding there, just because I think industries are interested too. There might be an opportunity to enhance that with some foundations or industry that are not only interested in pushing chemical substitution, but also tracking whether it makes a difference, whether certain chemicals are going down in the blood. Just a thought.

DR. WU: Yeah. No, I think that's a good point. And I think, it is very time intensive to respond to grant solicitations, but it is something that we need to get a little creative in doing and dedicate the time to do it, so -- but your point is well taken.

CHAIRPERSON SCHWARZMAN: Yeah. Ulrike.

PANEL MEMBER LUDERER: Can you hear me now? Closer.

All right. Sort of in the same -- similar vein, I guess, but not exactly the same, you know, collaborations what -- you mentioned we have -- people have doctoral students, you know, who might be interested in a project, and sort of along that same line,

collaborating with university researchers, you know, who -- so then maybe they write the grant, so the Program doesn't necessarily have to.

DR. WU: Um-hmm.

PANEL MEMBER LUDERER: But, you know, there could be common, I think there are lots of common areas, you know, that could be explored there.

DR. WU: Yeah, we actually are invited to participate in collaborations like that quite a bit. One of the things I alluded to is the difficulty in meeting a project timeline. So there are times that we don't want to commit to being able to deliver samples at a certain -- at a certain cost, because our future is a little bit uncertain. Sometimes we have fluctuations in staff that can't be projected, particularly with the -- you're looking ahead in time with a grant. It's a little hard for us to foresee how we might be able to meet them. We don't -- we don't want to impact somebody else's grant by not being able to fulfill the deliverables.

CHAIRPERSON SCHWARZMAN: Yeah. José. Please.

PANEL MEMBER SUÁREZ: Thank you very much for the update. There was something that we talked in the last meeting - and I'd like to bring it up again - is that maybe you should consider having that fee-for-service component for the lab. I know there are certain

restrictions as to how to do that.

DR. WU: Um-hmm.

PANEL MEMBER SUÁREZ: But I'm sure there's got to be ways to do it, because many other public governmental institutions do that, like CDC with Antonia Calafat. Of course, they have a very well established fee-for-service. And the NIH is big -- a very big funder for that.

DR. WU: Um-hmm.

PANEL MEMBER SUÁREZ: And some investigators, such as myself, and many others in academia are constantly looking for labs that can do very specialized work, such as the ones that you're doing. And some of the issues that we find is that when we want to do something, we have an NIH grant, and this needs to happen at certain time point.

DR. WU: Um-hmm.

PANEL MEMBER SUÁREZ: -- But if we go to say CDC, it often takes them a year for them to actually be able to look at our samples and then start working, because they're working on NHANES or whatever else is happening. So that could be something really to start tapping into. You have the machines. Why not keep on using them. And a portion of that really do it -- open it up for a fee-for-service, which would include, of course, fees for maintenance of the equipment.

DR. WU: Right.

PANEL MEMBER SUÁREZ: And with that, you have somewhat of a steady income to have also the staff running that. And I think what you're saying just also makes sense to us to -- should you be considering reducing the number of chemicals so you can really specialize a little bit more on that and have personnel that's been more attuned to those specific ones. But it's something that I just wanted to bring attention yet again --

DR. WU: Sure.

PANEL MEMBER SUÁREZ: -- that it might be something really worth thinking about.

DR. WU: And to be clear, we do charge collaborators for our lab samples. I mean, we'd love to be able to do everything as a public service, but there is a fee associated with it usually. I think -- Jed, I don't know if you want to address this as well, but I think we have been trying to make sure that we are trying to cover a little bit more of the costs in those fees for lab services. But it is a challenge and we are a public health lab as well, so we are -- we're not really set up as a private lab. Our priority has to be running samples that come into us as a public health lab.

CHAIRPERSON SCHWARZMAN: Veena.

PANEL MEMBER SINGLA: Thank you so much for that

update. It's really impressive what all the Program is doing with the limited resources. Thank you for that.

The question I had is regarding the next report to the Legislature, and what the timeline for that might be just thinking about a new administration coming in, and the importance of them understanding the work of the Program, and what's -- making sure they're informed and educated about that.

DR. WU: Sure. That is an excellent question. Lege Report 4, which was due, I believe it was 2016, has been in the works in the review process. And one of the real sources of strength for the Program is our collaboration across departments, but it is also one of the challenges in having two separate review chains. So it has gone through this multitude of review chains. And I believe it is almost out the door. But it is, of course, a little bit on the late side at this point.

Lege Report 5, which is a little more timely, has made its way up to upper management within our chain. And it is making its way apace and may lap its predecessor. I'm not sure. So I really can't comment. We don't -- we don't get many updates once it leaves our control.

But that is to say we are -- we get our reports out. And it is hoped that that will be expedited as biomonitoring becomes a little bit more visible as a

priority. And we hope the new administration recognizes it is as such.

CHAIRPERSON SCHWARZMAN: Okay. Other questions for Nerissa? If there aren't other Panel questions right now, I'll open it up to public comment. Do we have any comment from the web?

MR. BARTLETT: (Shakes head.)

CHAIRPERSON SCHWARZMAN: No comment from the web.

Any comments from the room, public comments from the room?

And if not, then we'll just go on smoothly to Panel discussion, and which we have time for now, even though some of the questions have been discussion oriented. We still have some time before our next presentation. And I just wanted to flag maybe two questions that I heard Nerissa ask. One was about lab prioritizes -- prioritizing lab panels, and whether there's any guidance that the Panel could provide about how those priorities might be set.

And the other question I heard her ask was sort of how the Program might further support public health goals through other -- the activity of other researchers or sort of divisions. And I'll just start off for a sec with one thought that has been on my mind for a little while, and I'm increasingly hearing calls for - I find it

an intriguing topic - is assessment of regulatory effectiveness, because it's not something that has typically done -- been done very much, partly because it's not usually planned for at the time that regulations are designed and passed, they don't -- so it's not Biomonitoring California's oversight.

It's a -- you know, it's not how we've often designed and implemented public health regulations, but we have the opportunity through this program to figure out what kinds of studies might help assess regulatory effectiveness. And I know there's -- that the staff is already thinking about that capacity with regard to diesel exposures in some substudies of CARE and the East Bay Diesel Project.

And Tom mentioned something that I know has also been on staff's mind about paring with Safer Consumer Products Program, when, you know, a priority product is named and there's a call for alternatives assessments, and ultimately regulatory response to alternatives assessments, that there's the capacity within -- there's potential at least for Biomonitoring California to supply some data that informs the outcomes -- you know, what was the outcome of that intervention.

I'm currently working on a project that I've talked to some staff about, a research project on the

impact of Proposition 65, and we're looking for some Biomonitoring California data that's sort of going to be coming in over -- excuse me -- over the course of our three-year study period, because perfluorinated substances have -- are recent additions, and phthalates, and there may be actually -- I have a grad student who's going to be looking at this a little more closely, but what the time overlap is. You know, do we have appropriate spans from -- of biomonitoring data from before listing of Prop 65, and after listing.

And so what we've found in the process of looking at those data - we're looking at NHANES data also - is that it's such a patch work currently. We have so much -- we do so much sort of trying to string together disparate pieces of data that are then not actually comparable, because they weren't measured in the same population or in the same way. And that a bit more intentional and purposeful study design that's intended to study, evaluate regulatory effectiveness would be wonderful. This is like a wish list. I'm not suggesting that Biomonitoring California has been dropping the ball, because I know you don't have the resources to do this.

But if I were making my wish list, and I think it's a public health priority, because we get some feedback then about what interventions and what public

policies are -- actually have the intended effect, which could ultimately make those interventions much more efficient.

So it's a priority that I'm really interested in exploring how we might develop in the event that funding is available to do such things, or to think about as studies that are launched, you know, or as CARE is expanded, or continues how to direct resources, so that they're also answering some of those questions for -- limited to what we can do under CARE by budgets.

Anyway, that's a priority I'm interested in. Other thoughts from the Panel?

Tom.

PANEL MEMBER McKONE: Now, I don't have to struggle with turning on the microphone. I just take yours. I want to build -- again, I'm very supportive of the suggestion, and I think it's very powerful to monitor regulatory effectiveness. I'd also like to suggest the other side of the equation, which is when health scientists are studying disease patterns, and we have a lot of opportunity now to do a lot more medical surveillance, a look at hospital records, and drill down, the same thing there is if we had the biomonitoring data, you can go the other way.

I mean -- and I agree with Meg, we want to go

from sort of product-use patterns to what's in the blood or what's in urine and blood that we can see related to patterns of use, and when we change the composition of products, then what do we see?

But then the other side of the equation is can we match up trends in health status, other than -- there's a whole bunch of things where -- I know this is ongoing research, but tying into it, helps the Program. I mean, it helps the science, but it also helps the Program with visibility and effectiveness when somebody goes, oh, well, you know, we have these health studies and we're seeing like dramatic increases in depression and certain age groups.

Well, as somebody says, is there any hypothesis we could test. Well, then you could go -- you could look at a lot of the things, but it would be nice to have the biomonitoring portfolio available for running in that direction.

PANEL MEMBER LUDERER: Yeah, I agree, but -- with what Meg and Tom said. And I think that being able to assess interventions and regulatory impacts is really important. And I think if we're getting back to kind of the question about what chemicals are important to maintain ability to monitor, if you're going to be assessing impacts let's say of a regulation, obviously,

it's important to maintain older panels of say things that are being phased out.

But then also, I think, the flip side of that, which is something that the Panel has been concerned about, I think, since the Program started, is to also then be able to monitor the replacements, because we're obviously always very worried about regrettable substitutions that happen all too often.

So, obviously -- which I guess what I'm getting at is that decreasing the things that are biomonitored is -- you know, that's a very -- it's a very difficult -- those are really difficult choices to make. Now, ideally, you'd like to be able to keep monitoring a wide variety of things, and be able to repeatedly -- you know, to follow the patterns and populations, which is, I guess, really an argument for the Program needs more funding, so that it can continue to main all these -- maintain these panels.

CHAIRPERSON SCHWARZMAN: Other comments.

Eunha.

PANEL MEMBER HOH: This is the first meeting so -- but I guess my thought was, you know, I'm actually -- I'm running a lab and analyzing quite a chemicals. And I'm pretty much sympathetic to the great under resource. The more and more the -- you know, the instruments are more advanced, and then the humans --

actually, the workers can maintain the instruments is harder and harder, you know, which I think that the management has to understand that point.

So in like 10 years ago, 20 years ago when I was PT student, I was able to fix the instrument. And then, you know, the running the instrument -- things. But now the instruments are so much advanced, which means we can detect better, and detect much lower levels, and then can provide a lot more information. But the flip side that we can't really fix the instruments, you know.

I mean, so there's something that I think we have to understand that point, you know, to carry out the project. And I -- there are several things that probably are very interesting thing is always that why we don't collect the data together with the health data together, you know, kind of working with the more medical people out there. But that's something that I was thinking, but something -- there may be someway that maybe the Department of Public Health could probably try.

CHAIRPERSON SCHWARZMAN: Veena.

PANEL MEMBER SINGLA: I definitely agree with the importance of assessing regulatory effectiveness and understanding the effectiveness of interventions --

MS. HOOVER: A little closer Veena.

PANEL MEMBER SINGLA: Um-hmm -- understanding the

effectiveness of interventions.

Along those lines, I had a couple thoughts. One is because information on PFAS exposures is already planned as part of the CARE biomonitoring, if -- to coordinate with Safer Consumers Products on potential information that could be useful down the line as they're planning their actions on PFAS chemicals, I think there's already really good dialogue there. But just to understand if there's any additional information or different kinds of information that could be added on there, that would be useful to assess the effectiveness of their actions, you know, on a longer timeline.

And similarly, on flame retardant chemicals, since California did pass legislation banning flame retardants from a few classes of consumer products, to think about if there is any sort of study design that could be started now to assess the effectiveness of that policy, when -- once it is implemented and takes effect.

And then thinking about -- I agree with the comments that were made that it's a very -- it's challenging to think about, you know, reducing the number of panels or streamlining, because it's all very important information.

But I wonder to what extent, with the information that CDC collects through NHANES on -- on Californians, if

some of that information could -- could help -- could feed into your analyses, and could help to streamline some of the panels that you may be doing in common with CDC. I don't know, but I wonder if there could be some streamlining there.

CHAIRPERSON SCHWARZMAN: Just to maybe work with that idea a little bit and a question for staff who has a more complex relationship with CDC than I do, and know more about the NHANES data, but -- so my understanding of that NHANES is essentially unwilling to release state-specific data. Because they sample it at so few locations, they're getting data that's representative of the U.S. population but not exactly representative of the California population, and so -- and they sample so few areas that they worry about confidentiality, if they release state-specific data.

We are doing something in our Prop 65 research project, where apparently you can make a request of the NHANES to study -- to look at data -- biomonitoring data from an area that's specifically affected by a particular policy. And so we're requesting data from areas that are affected by Prop 65, which we hope will be a way of accessing California-specific data.

But that's sort of a -- that's a workaround that we'll see how effective it is. But, of course, that's

a -- it's not necessarily representative of the California population. It's meant to be representative of the U.S. population.

Anyway, I just wanted to kind of put that out there to hear a little bit more from staff who I'm sure have worked with this idea about -- you know, one of the things I heard you saying maybe, Veena, is there a way that California can get more bang for our buck by not duplicating NHANES work essentially?

And I -- I'd just be curious if you have thoughts about whether that's a possibility or do these issues stand in the way of that?

I mean, one of the things that biomonitoring can do -- in California can do is provide more granular information and it's one of the reasons -- things we hoped it would do is provide more granular state-specific, community-specific information that NHANES possibly can.

But maybe Veena's question still stands about are there ways that NHANES can take some of the pressure off of -- no. Sara just says no.

(Laughter.)

DR. WU: Yeah. We have tried in the past to access state-specific data and have not been successful. So I'll be really curious to see if you were effective.

(Laughter.)

CHAIRPERSON SCHWARZMAN: Okay. Yeah. Jennifer may have a reflection on it.

DR. MANN: Hi. I'm Jennifer Mann. I'm with Biomonitoring California.

MS. HOOVER: Closer. Closer.

DR. MANN: Jennifer Mann, Biomonitoring California.

I do want to say that there are reports, but they're really not helpful for biomonitoring from CDC, both about Los Angeles and California, because apparently the Los Angeles area is pretty much part of every wave of NHANES, two-year wave. And so they release, I believe, it's eight-year reports for both L.A. and California. You can't seem to request those data. It doesn't -- it's not clear that you can.

And the reports are not about the kind of data we're interested in. They're things like blood pressure and those kinds of things that they're reporting on, partly maybe because of there's -- they can analyze those things, because they sample them on everybody.

So there's that. And it's a little bit frustrating when you -- it's a little bit frustrating, because it's tantalizing. You know it's there, but you can quite get it. But Meg is right, they're not interpretable the way we would want to interpret them.

I will say that we always -- that as far as -- with a few exceptions, we are looking at things that NHANES also studies, so that we have a context to know whether or not we're seeing something different from national data. There are PFASs that we added that are not measured by CDC, so there are areas in which we are -- we do deviate, but it's a little bit hard to, in my mind, completely divorce ourselves from CDC, because they do provide that context.

CHAIRPERSON SCHWARZMAN: I notice that's one of the things that's in report resulting -- result reporting -- excuse me -- packets is where do these findings stand relative to the national averages reported through NHANES, which I think is really relevant and helpful piece of information.

MS. HOOVER: This is Sara Hoover, OEHHA. I just wanted to add that actually the law mandates that we measure all designated chemicals which are from CDC. So the foundation of our program is CDC, and that's part of our charge. So interesting idea, but I think not really feasible for various reasons that have been cited.

In terms of just, you know, we also put up kind of our wish list in terms of what we might do with more funding, you could throw in a few comments about that. And then also, just to foreshadow a little bit of SGP

topics for 2019. We don't have much time for discussion, so one of the things I'm putting out there today is the possibility of doing more chemical selection in 2019. This is obviously aspirational, because we don't necessarily have, you know, the laboratory capacity to fulfill that.

But I'd also like anybody to think about emerging -- you know, specific emerging chemicals of interest that are not already covered by our very clever class approaches that are already on the designated chemical list. So just something to think about. If anyone has ideas, feel free to chime in.

CHAIRPERSON SCHWARZMAN: Any additional Panel comments?

Yeah, Oliver.

PANEL MEMBER FIEHN: I see here on the wish list support for non-targeted screening. As I feel I'm one of the experts in the area, I would like to encourage the laboratories to engage with NIH programs in this area, the CHEAR and a number of other programs very active in this area. So instead of trying to reinvent the wheels, you know, there should be active -- very active interaction between the State laboratories and laboratories who conduct such kinds of non-targeted screening for environmental pollutants.

There are also, in California, quite a number of conferences and workshops that engage in this area. For example, now in November in San Francisco, the ASMS workshop on non-targeted screening, compound identification with people from Europe who come into the city who focus on environmental analysis for a long time.

So I always had a bit of feeling that this type of interaction was not happening or maybe not happening enough. And, you know, I cannot say if that is also the same for targeted screenings. But in my own laboratory, we have massively improved the throughput, even for targeted screening through looking at our procedures, seeing what type of new software can be used, what type of new sample preparation methods can be used and implemented, what other people have published to reduce time, and, you know, for both the sample preparation but also for analysis time.

So there is quite a bit of room for improvement, even for older assays. You know, if there is, as you say, the strengths and the will, and maybe also graduate students. As you have said, you know, graduate students are welcome. Well, it goes both ways. You know, actively seeking out, you know, expertise from laboratories within and outside of California, as well as, you know, receiving.

PANEL MEMBER CRANOR: Carl Cranor. I want to follow up with the non-targeted screening for a moment. One thing the biomonitoring has well done is targeted screening where you really suspect something is going on in a subpopulation and you pursue that.

But there may be things that we don't -- we don't know about that have emerged. And I take it that falls under non-targeted screening. So what are the possibilities for doing non-targeted screening and can the Program align -- ally itself with other agencies that may have money that CDC doesn't have?

And I could talk -- not now, but I could talk about some agencies that actually may have a fair amount of money and open up some possibilities there.

So if you get a mysterious compound, and you don't know what to make of it. There are libraries around that have that information. And it would give you a clue as to maybe new things that are on the horizon. Just a query and what the possibilities are.

CHAIRPERSON SCHWARZMAN: Does staff want to say anything about that or we'll move on.

I was going to take off a moment on that idea just to mention -- I think you're probably already aware of Martyn Smith's lab's work on the exposome. And I mentioned it now just because we were part of a larger

research collaboration in which that lab was doing some work on sort of total estrogenicity of serum samples and then trying to look back at what -- do some non-targeted screening comparing the women with higher. So you take the blood or serum from the women, you test them against in vitro screens for estrogenic action, and you sort them into higher and lower total estrogenic activity in the blood or serum. And then you do non-targeted screening to compare what's the difference between the chemicals in the blood of the women who have higher estrogenic activity in vitro compared to the ones who have lower.

Anyway, that's -- I think that probably falls more into the area of sort of exploratory and new method development. And I don't know that it's ready for a, you know, complete overlap with Biomonitoring California studies, but I do know that they have had some difficulty identifying some of the compounds that might account for those differences in estrogenic activity.

And so I mention it not as like, oh, this is manage you could do right now, but maybe to put it on the radar as a conversation that might be helpful to hear what's -- where they are in that -- last I knew about it was February -- that my update is from February.

Eunha.

PANEL MEMBER HOH: Yes.

I've been -- yes, I've been working on the non-targeted analysis as well, but not necessarily human serums or human samples yet. So -- okay. So -- but it's definitely -- I think it's worth really pursuing, because -- but could be different metrics. You know, not necessarily -- the goal is like, oh, if you -- we want to know like what chemicals are we exposed, which we didn't know before, and then selection of the samples could be very important.

Like, maybe the blood samples is not maybe enough or urine samples is not enough, but something like more dust samples, or some -- like a more exposure related, that subjects could be the good parts of it. And then also the study design is very important, so that, you know, how you're going to prioritize that. I mean, Meg mentioned about that kind of study, that estrogenicity positive and negative kind of stuff.

But it's more even like what -- how you're going to prioritize it, and then focus on what chemicals. If you found some picks, which were frequently detected, very abundant in a certain population, you know, and then you're going to work on the identification, because identification it's the big challenge.

But there are a lot of improvements going on in the libraries and everything.

CHAIRPERSON SCHWARZMAN: Veena, do you have a comment?

PANEL MEMBER SINGLA: I wanted to switch gears a little bit to comment on another one of the goals on the list here, which is the capacity to respond to emergency events. I think that is of really high interest and relevance. And I wondered if the current IRB allows that capacity at the moment, because I know that process can be quite lengthy, and that that might be something to start thinking about now to kind of get that process started and go through it.

It's on my mind. I was just at the Society for Environmental Toxicology and Chemistry, SETAC, meeting up in Sacramento and heard a really cool talk from a group that did some biomonitoring after -- sorry, excuse me, not biomonitoring. They used the silicon wrist bands after Hurricane Harvey in Houston to look at chemical exposures.

And their process for getting the IRB that could be turned around in 48 hours took them over a year and a half, I believe. So just wanted to raise that as a possibility.

CHAIRPERSON SCHWARZMAN: Do you want to respond Nerissa?

DR. WU: So last year when we were working with the San Francisco Firefighters Cancer Prevention Group, we

were able to amend a UC Berkeley IRB protocol to get out into the field within, I want to say, six weeks, by which time a lot of the non-persistent chemicals were gone. So our intention is to create a protocol, and get questionnaires written, and have our -- everything in order, and get an IRB approval in case of -- I mean, there will be wildfires coming up. That is sort of our new reality.

So that is one of the priority items for this collaboration that has sprung up between the firefighters, UC Berkeley, and Commonweal and our group. It's a matter of prioritization. So we are -- that is something that we would -- really would like to have ready for next year's wildfire season.

CHAIRPERSON SCHWARZMAN: José had a comment.

PANEL MEMBER SUÁREZ: Oh. Thank you. So I have a question kind of like backtracking a little bit. You mentioned a potential need to reduce the number of chemicals that may need to be biomonitored. My understanding is that that is more of an economic reason, right, is because that the budgets are reducing, so if that's correct?

Have you done the exercise of figuring out how much money you need to cut and how does that translate into how much potential classes of chemicals would need to

be reduced for your budgets to work?

DR. WALDMAN: Hi. My name is Jed Waldman. I'm the Environmental Heath Laboratory Chief here. So the Program has two labs, one at DTSC and one here at the Health Department. And the Biomonitoring Program under Jianwen She is my laboratory. So that's a provocative question, because we are often using resources fluidly, because the baseline of -- the baseline maintenance of the laboratory is beyond the scope of this Program and it's funding.

So it's -- we're always doing more than we can on paper is really the best answer I can give you, because we have other programs that are rising and falling, and instruments need to be maintained or our CLIA certification is -- has to be maintained. So the answer of predicting what we can do is always more dire. So I don't know if that's a hopeful answer that we're -- if you looked at it on dollars and sense, we wouldn't be able to do much of what we are actually doing, especially -- the last thing I'll say is the uncertainty is probably more damaging than the cuts, because if we actually got what we expected at all times, we could plan ahead, but things change, both up and down.

PANEL MEMBER SUÁREZ: I mean that could be something that at least for us in the scientific end of

this Panel we would benefit from to start thinking about certain things. If you tell us, well, we may need to cut five different classes of chemicals, which ones should those be, or which ones should be replaced with some of the newer ones that we started to discuss. I think that would be something that would be very useful to do.

DR. WALDMAN: What I will say is that for the CARE studies, we have ratcheted back to sort of a minimal set of compounds. And for each cycle we will be adding -- you know, for example, the phenols are being tested on a subset, and we'll -- presumably when we bring up other methods, we'll be able to sort of cycle back, so we're committing to is a -- is a -- is the baseline. And as our ability, you know, increases then we can cycle back and then add a panel to our archive samples.

PANEL MEMBER SUÁREZ: So do you think it makes sense to start thinking about it in those terms as to -- for next year's budget, considering that this is a number of different chemicals that we can afford, and for some of the other classes maybe identify how many should be reduced? Do you think that's something that would be helpful?

MS. HOOVER: Hi. Sara Hoover, OEHHA. We're going to move on to the next item, but I'll quickly say we plan years in advance, so we've done that exercise. And

as Jed was just alluding to, that exact prioritization and what we're capable of doing informed what we chose for CARE. So that's always embedded in all of our planning.

With that, let's...

CHAIRPERSON SCHWARZMAN: Thank you all for your thoughts and contributions. We're going to move on to the next presentation. And thank you, Nerissa, as always for an informative and inspiring also update of what the Program is doing with limited resources.

Our next presentation is going to be Jennifer Mann and Lauren Baehner -- did I say that correctly?

MS. BAEHNER: Yes.

CHAIRPERSON SCHWARZMAN: Great -- who are presenting on biomonitoring results for metals from BEST and ACE as I mentioned earlier. Jennifer and Lauren are both research scientists in Nerissa's group here at CDPH.

(Thereupon an overhead presentation was presented as follows.)

DR. MANN: Hi. I'm Jennifer Mann, and I'm -- today I'm going to be talking about what we found when we analyzed urinary and blood metals in the Biomonitoring Exposures Study.

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DR. MANN: I'm just trying to figure out -- oh, I -- that was not the right thing to hit.

Okay. Starting off well. Okay.

Thank you.

The Biomonitoring Exposure Studies, as you'll learn in a minute, were done quite awhile ago, but -- and the data have been posted to the web. And I believe this is the first presentation of results from these studies. There will be more coming up in future SGP meetings.

So the Biomonitoring Exposure Study was a collaboration with Northern California Kaiser Permanente Division of Research and Biomonitoring California. And it was a sample of adult Kaiser Permanente members from the Central Valley. And you can see the seven counties that people were from here.

And so the way that it worked was members were stratified by gender, two different age groups, 18 to 55 versus older, four race/ethnicity groups, and also urbanicity. And then they were randomly selected from each of these categories. And the idea was that there would be a balance. So there would be an even number of each race/ethnicity, each gender, each of the two age groups.

So the pilot, which was done in 2011 and 2012 had 112 participants. And that yielded 110 blood samples and 108 urine samples. After the pilot was over they took a good look at the data and what happened, and -- be focused

a bit. And they decided to oversample Hispanics and Asian-Pacific Islanders. And they also had an interest in looking at whether or not language spoken at home among Hispanics were any relationship to concentrations of the different things that were being biomonitored. And the list is really long for BEST. I'm talking about metals today, but there -- this was back in the day where a lot of things were looked at in everybody.

There were 341 people who participated in the expanded phase of BEST that yielded 315 blood samples. From those blood samples, 218 people were selected to have their urine analyzed. And it was done in a way to maintain this balance across race/ethnicity.

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DR. MANN: So given what I just said, it's not surprising that there were a lot differences between the participants characteristics in Pilot and Expanded BEST. So we know that there's going to be a difference in race/ethnicity proportion. And you can see here that in Expanded BEST, 33 percent of the participants were Asian-Pacific Islanders, and 41 percent were Hispanic.

Given the earlier goal of looking at trying to get half of those Hispanics having Spanish as language preference and half as English is the Spanish preference, it's not surprising that 17 percent overall of

participants preferred Spanish language in Expanded BEST, which is really different than the pilot.

Unanticipated, but explainable, are the differences we see in age. Expanded participants were younger by about eight years, and about a four-fold increase in the number participants who came -- who had a rural residence. Remember, the goal was about 50/50, so they were much more able to achieve that goal in Expanded BEST. And this was partly due to logistical differences between the two phases.

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DR. MANN: So there's going to be two parts to my talk. And the first part, I'm going to be talking about the geometric mean levels of metals in pilot and expanded phases of BEST, and how they compare with data from NHANES. And in the second part, I'm going to be discussing predictors of urinary and blood metal concentrations in Expanded BEST.

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DR. MANN: So here, we see the metals that were analyzed in both Pilot and Expanded BEST. They were on -- urinary metals were arsenic, cadmium, and mercury. Blood metals were cadmium, lead, manganese, and mercury. And for those of you who are wondering why cadmium and mercury are both measured in urine and blood, urinary cadmium

reflects longer-term exposure.

Whereas, cadmium in the blood reflects more recent exposure. For mercury, urinary mercury -- blood mercury is looking at mercury that is methylated, whereas urinary mercury is not.

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DR. MANN: In Expanded Best, We added all of these different urinary metals to our Panel. And this is the first time we had an expanded urinary panel. And we added cobalt, manganese, molybdenum, thallium, Tungsten, and uranium.

Of these, several of these new metals are -- continue to be measured. And in CARE, we are measuring cobalt, manganese, molybdenum, and uranium, as well as some other metals that you don't see on this list.

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DR. MANN: I'm going to go through a series of seven slides somewhat quickly, so let me spend a little bit more time on this first slide, so you understand what's going on here.

These are geometric mean and 95 percent confidence intervals for each metal that you see. Here we have it for arsenic. The very first geometric mean that you see is for Pilot BEST, which was conducted between 2011 and '12. And that corresponds nicely with NHANES

data from 2011 and '12. Expanded BEST was done in 2013. And so we compare it to NHANES data from 2013 to 2014. And here you can see that for arsenic, levels were much higher in both phases of BEST than they were in NHANES. They were 44 and 47 percent higher respectively.

Sorry.

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DR. MANN: Here, we have the results for urinary cadmium. You can see again that cadmium levels were higher for BEST, significantly higher than in corresponding NHANES data. And here, they're 37 percent and 33 percent higher than in the national data.

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DR. MANN: We see the opposite pattern for mercury -- for urinary mercury. Levels were much lower in BEST.

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DR. MANN: And for blood cadmium, levels were lower as well compared to NHANES. And the difference for the pilot phase was statistically significant.

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DR. MANN: Then here for blood lead, we see that levels were similar to national data for pilot phase, but they were significantly lower in the Expanded phase.

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DR. MANN: Mercury, there were no differences with national data.

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DR. MANN: And manganese had lower -- significantly lower levels in the Pilot phase.

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DR. MANN: Now, I'm going to go to the second part of my talk, which -- where I'll be looking at prediction models for urinary and blood metals from Expanded BEST. So this is using information we had from our exposure assessment questionnaire, and demographic information on our participants and seeing how it predicts levels of lead.

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DR. MANN: Am I not close enough?

CHAIRPERSON SCHWARZMAN: Oh, we're going to interrupt for a quick technical question.

PANEL MEMBER McKONE: Can you go back to those slides. I just had a real quick question.

DR. MANN: Which slide?

PANEL MEMBER McKONE: The one showing the ranges. Just go back one.

DR. MANN: These plots.

PANEL MEMBER McKONE: So when you shows a range -- okay. When you -- when you have that line, is

that the variance among the samples or is that the variance about the mean of sampling uncertainty?

DR. MANN: It's the 95 percent confidence level.

PANEL MEMBER McKONE: That is the 95, okay.

CHAIRPERSON SCHWARZMAN: Ninety-five percent confidence interval on the mean or --

DR. MANN: Yeah. Yes.

CHAIRPERSON SCHWARZMAN: On the geometric mean.

DR. MANN: On the geometric mean, right.

CHAIRPERSON SCHWARZMAN: Thanks.

DR. MANN: Based on the variance so, yeah.

PANEL MEMBER McKONE: Yeah, I got it.

DR. MANN: Yeah. Sorry, I didn't explain that more thoroughly. I'm glad you asked, because that geometric mean and 95 percent confidence interval appear later as well.

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DR. MANN: So the first slide I want to talk about in terms of predictors are -- this is the familiar list of urine metals that we -- I just discussed that we looked at in Expanded BEST. The detection frequency was pretty -- was very good actually for most of the urine metals, above 90 percent, except with two exceptions. Uranium had a detection frequency of 86 percent and manganese had a detection frequency that was only 60

percent. That was too low to calculate a geometric mean.

So the interesting thing about this slide is in the next two columns -- so the column two is looking at -- or, I guess, that's column three is looking at geometric means in Expanded Best. And then next to that, you see the geometric means for NHANES 2013 to '14. I don't have confidence intervals here, but where you see a red star, the differences are statistically significant. So it's interesting here is that in every case there's a statistically significant differences.

And this is something we don't often see when we compare data to NHANES, but we're seeing it here. So arsenic, cadmium, molybdenum, thallium, tungsten, and uranium were all significantly higher in the BEST -- in the Expanded Best Study, and cobalt and mercury were significantly lower.

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DR. MANN: For blood metals, we didn't see anything so dramatic. Lead was significantly lower in Expanded best compared to NHANES, and the others were not significantly different.

So now I'm going to shift over and talk about a little bit how these prediction models were built. We considered the same variables in every model for -- so for every metal we were looking at the same variables, and

they were sex, 10-year age category, race/ethnicity, and that was Asian-Pacific Islander, Hispanic and African-Americans, where white was the reference group.

We had several questions about diet. And here we looked at days per week consumed of grains, fresh and canned fish, vegetables, and fruit. We also looked at the impact of time in the United -- that you lived in the United States, educational level, whether you were a current, former, or never smoker, and whether or not you had a rural residence. I'm not going to be looking at the results for all of these things. I'm going to be highlighting results for certain predictors.

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DR. MANN: Our statistical analysis was regressions, where we were trying to predict the log of the metal -- changes in the log of the metal. And our effect estimates are expressed here as a percent increase or decrease relative to a reference group, in the case of categorical variables. And in the case of the diet variables, looking at the change in concentration of the metal with a one-day per week increase in consuming the food. And we also looked at tests for trend, for age group, smoking status, time in the United States, and educational level.

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DR. MANN: This slide shows the explanatory power that we found for the models measured with R^2 and expressed as percent. And you can see for the most part for the urine metals, the explanatory power of the models was pretty low. It's disappointing, but it's also not surprising, because our questionnaire has to cover exposures to a variety of chemicals. And we have to really scope our questions down, so the questionnaires don't become too long.

But we actually received very good explanatory power for creatinine-adjusted cadmium, where 52 percent of the variation in that metal was explained by the model. We did better when we looked at blood metals, at least double, ranging from 20 to 42 percent of the variation in those metals was explained, and we did best with blood lead.

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DR. MANN: Now, I'm going to talk about certain predictors that we looked at in isolation. And I want to remind you when we're looking at these things, they're adjusted for everything else in the model. So now here, this study is looking at race/ethnicity, and we're seeing the percent difference relative to the reference group, which was non-Hispanic whites, for the three different other categories Asian/Pacific Islanders,

African-Americans, and Hispanics. And these results are adjusted for sex, age group, education level, time in use in the U.S., and smoking status, and actually rural residence, which I forgot to put on here.

And to explain this -- with the first row, how to interpret these coefficients pretty clearly, what that first cell of -- what we see here is that Asian/Pacific Islanders had a blood mercury concentration that was 63 percent higher than what was seen in non-Hispanic whites. And whereas African-Americans had blood mercury concentrations that were 14 percent lower.

So for urinary mercury we see increases in all three groups relative to non-Hispanic whites, and almost double in African-Americans relative to non-Hispanic whites. For total arsenic, we see that Asian-Pacific Islanders and African-Americans were higher. Whereas, for molybdenum and tungsten, Hispanics were the one group that were higher -- that were significantly higher.

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DR. MANN: I'm going to talk about the diet variables. What we asked -- we asked questions about how often -- how many days per week you ate these foods? And here you -- you're going to see -- so you were allowed to say zero, if you didn't eat the food at all, one, and then up to seven. And this effect is for a one-day increase in

consumption of that food per week.

So for -- there was an association of higher levels of blood mercury, if you consumed fresh fish. For each day -- additional day per week that you consumed that -- that item, the blood mercury concentrations went up 23 percent. So that's how you interpret these effect estimates.

Blood mercury was associated with increased consumption of fresh fish and canned fish, not surprisingly.

For arsenic we only found a relationship with fresh fish, not canned fish. We found some other associations that are a little bit hard to interpret. So we'll find out what we see in future studies. But for thallium, fish was associated with reduced concentrations consumption of canned fish. Whereas, fresh fruit was associated with increased consumption of -- sorry. Fresh fruit consumption frequency was associated with increased levels of thallium. And canned fruit consumption was associated with increased levels of cobalt.

So everything -- so grains, fresh and canned vegetables and -- grains and fresh and canned vegetables were not associated with increased levels of any of the metals in Expanded BEST. And it's important to note that the BEST Study did not include a specific question about

rice consumption. It asked about grains.

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DR. MANN: Another variable that we looked at was generation and time in the U.S. The reference group here was people who were born in the United States. If you weren't born in the United States, participants were categorized by the number of years they lived here with those people living here less than or equal to ten years being in the bottom category. And those people living here up to 25 years being in the top of that category.

The only metal that was associated with time in the U.S. was uranium. Uranium levels were associated -- uranium levels decreased with time in the United States.

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DR. MANN: And finally, I want to look at urban or rural address. This study was one opportunity to really look at the differences between rural and urban exposures. We're not sure we're going to be able to effectively look at this in CARE, because of logistical issues, although we're interested in it.

And so I took a look at the impact of this -- to look at what we saw with patterns of rural or urban address. The study used a census definition called UR10. And it's based on population density, and land-use designations to define an area as urban.

And then anything is not -- that is not defined as urban is automatically rural. And this may or may not be a proxy for private well water use, which we did not specifically ask about in BEST. So participants from rural areas were higher in molybdenum, thallium, uranium, and blood manganese.

One of -- something that you may not see on this list that you may find surprising is arsenic. Arsenic did not come up.

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DR. MANN: So, in summary, many of the metals added to the urinary panel for Expanded BEST were higher than in NHANES. And the significant concentrations for urine metals was significant across the board, where we could calculate a geometric mean. There were elevated metal concentrations in non-white groups even after adjustment for all of the other predictors. And Asian/Pacific Islanders became a special group of interest while we were doing this study. And it's one motivation for the Asian/Pacific Islander Community Exposures, or ACE, Project, which Lauren -- you'll hear about from Lauren in a minute.

We also saw elevated levels of urinary molybdenum, thallium, uranium and blood manganese in rural participants. And the reason for the higher levels still

need to be explored.

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DR. MANN: So we have a lot of works in progress coming up for BEST. There are two journal articles that are being completed or worked on right now. One based on what I presented today that looks at predictors of urinary in blood metals, and another on perfluorinated compounds. And we're also -- we also have a student project coming up. It's going to be looking at diet, especially frequency of eating organic food, and levels of pesticides in the Expanded BEST participants.

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DR. MANN: I want to thank Kaiser Permanente Division of Research Northern California. Stephen Van Den Eeden was the PI over there. Jun Shan helped with analysis, and Amethyst Leimpeter was the -- was very active in actually conducting the study.

I also want to thank all Biomonitoring California staff who contributed to Pilot and Expanded BEST.

CHAIRPERSON SCHWARZMAN: Thank you so much for that.

If you'll stay up for a sec, we have a few minutes for Panel and audience questions. So we'll have discussion after. This is just sort of for clarifying questions for Jennifer.

Yes.

PANEL MEMBER McKONE: Yeah, I want to go back to follow up a little bit more about the dispersion of the data.

First of all, I don't -- I mean, it's definitely correct and important to look at the geometric mean.

DR. MANN: The plots.

PANEL MEMBER McKONE: Yeah, the plots. So the geometric mean is certainly an important statistic for comparison, because, you know, you're looking at the center of a population.

DR. MANN: Right.

PANEL MEMBER McKONE: I think the only thing I'd be interested in hearing about or seeing perhaps is a little bit more about how there's dispersion. I mean is this -- are most of these fairly neatly log normal or you --

DR. MANN: They're all log normal. They're all transformed as log normal, and then expressed as geometric means, which is the exponentiation of that.

PANEL MEMBER McKONE: Because you can get a geometric mean, and then if you look closely, you find out you actually have a distribution.

DR. MANN: No.

PANEL MEMBER McCKONE: Because two -- with two

modes or it's bimodal that's kind of how

DR. MANN: No, it actually does a really good job of transforming the data --

PANEL MEMBER McKONE: Okay.

DR. MANN: -- when you look at it.

PANEL MEMBER McKONE: Again, if it did do that -- I mean, a lot of things in populations do have modes, because you have subgroups and.

DR. MANN: Right.

PANEL MEMBER McKONE: You could have different behaviors and then there will be a cluster low -- and the mid -- I mean, you could still find the geometric mean.

DR. MANN: Right.

PANEL MEMBER McKONE: It will be in the center, but then the mass is dispersed in an odd way --

DR. MANN: Well, the other --

PANEL MEMBER McKONE: -- but you didn't see that.

DR. MANN: Sorry for interrupting. The other thing was that we have a -- one of the reasons we have that rule of having to have a minimal detection frequency of 65 percent is because you can get clustering of values that are below the detection limit. So that becomes less of an issue.

And here, it's really pretty much not as much of an issue, because for so many of the urine metals, they

were above 90 percent detection frequency, but that is a place where you can have problems. And that's also why we didn't look at urinary manganese -- predictors of urinary manganese. It's the same issue.

PANEL MEMBER McKONE: I mean, that's an artifact of the rule we applied to the limit of detection. That's not a true cluster. It's just a cluster of --

DR. MANN: Right, exactly. It's an artifact of the rule we applied that makes a geometric mean less interpretable, I guess, which is...

CHAIRPERSON SCHWARZMAN: Ulrike.

DR. MANN: Did you have another suggestion, Tom, about how we might want to look at -- or just that we check?

PANEL MEMBER McKONE: No, I would say -- so actually the geometric mean is not biased very much by having a limit of detection problem, because still as long as you have some data below the median --

DR. MANN: Okay.

PANEL MEMBER McKONE: -- the median -- the middle point will still be the middle --

DR. MANN: Right.

PANEL MEMBER McKONE: -- even if like half of the -- or 25 percent of the population is the limit of detection. That's why it's really important to use.

DR. MANN: Right.

PANEL MEMBER McKONE: And where I'd be really nervous is if you were talking about a mean where you had a number of samples at or below the limit of detection, because then you really bias the mean way off.

DR. MANN: Right.

PANEL MEMBER McKONE: And so again, I -- as I said at the beginning, it's the right way to do it.

DR. MANN: Right.

PANEL MEMBER McKONE: I'm just worried about whether -- particularly at the high end, you saw some kind of clustering.

DR. MANN: Right.

PANEL MEMBER McKONE: But it sounds like it was pretty neatly log normal above --

DR. MANN: Yes.

PANEL MEMBER McKONE: Great.

CHAIRPERSON SCHWARZMAN: Ulrike.

PANEL MEMBER LUDERER: Yeah, I just had a quick question about your arsenic. So you reported associations of total arsenic. Did you -- were you able to speciate that or not?

DR. MANN: It was speciated. It's just not part of this talk.

PANEL MEMBER LUDERER: Okay. Because --

DR. MANN: And there's actually another paper that Sara or Duyen can talk more about that's looking at what they found when they looked at speciated arsenic. So arsenic wasn't speciated in everybody. It was speciated in people that had elevated total arsenic. So there were, I believe, 29 people in Expanded BEST who -- for which we did speciation, is that correct?

PANEL MEMBER LUDERER: Because I'm thinking that probably your elevated -- your association with eating fish was related to organic arsenic through speciation?

DR. MANN: Right. So they've looked at that much more carefully, and follow-up surveys also asked about consumption of different foods including rice.

PANEL MEMBER LUDERER: Great.

CHAIRPERSON SCHWARZMAN: Other questions?

Oh, yeah. José.

PANEL MEMBER SUÁREZ: Oh, yeah it is.

Yeah, I also saw the uranium levels decrease with time in the U.S. So that's an interesting analyses.

DR. MANN: Yeah.

PANEL MEMBER SUÁREZ: Did you then -- so the question -- the next question would be did you look at the different places where people are coming from, because that would make a big difference for your --

DR. MANN: That is -- was part of the

questionnaire. The countries that people came from, if they weren't born here, tended to be from Central and South America or from Asia. And that's partly related to oversampling in those two groups, but I haven't looked at that more specifically yet. But it's certainly something interesting --

PANEL MEMBER SUÁREZ: That would be interesting looking at uranium just from the general --

DR. MANN: Right.

PANEL MEMBER SUÁREZ: -- from -- you know, from water sources, which can be present --

DR. MANN: Right.

PANEL MEMBER SUÁREZ: -- or is it something more, you know, radioactivity --

DR. MANN: Right.

PANEL MEMBER SUÁREZ: -- at power plants and what not.

CHAIRPERSON SCHWARZMAN: Yeah, Lauren.

DIRECTOR ZEISE: Yeah. Just following up maybe on the dispersion issue a little bit more. Did you look at differences in variance across the groups?

DR. MANN: No, I haven't done that yet.

DIRECTOR ZEISE: That would be an interesting thing to look at as well.

DR. MANN: Yeah.

CHAIRPERSON SCHWARZMAN: I had a question. I understand the topic of today's discussion is metals, but I'm looking at the list on the website of all the other chemicals that are biomonitored in BEST. You're not talking about them today. Have the analyses been done or is that just a personnel limitation. And you mentioned --

DR. MANN: Yes.

CHAIRPERSON SCHWARZMAN: You mentioned perfluorinated compounds you're working on a public questionnaire.

DR. MANN: Yes. Yes. So there's been a paper in the works. This paper and the other paper that I mentioned have been in the works for quite awhile. It's what happens when you have people who come and do most of a project, but then have to leave. And so my goal is to work with both of these people that have done a tremendous amount of work to get those papers out.

And then we had a student project that looked at perchlorate in Expanded BEST. It was not going to lead to a publication, but they did do that analysis. There are a lot of analyses that people started pursuing and then stopped, maybe because they didn't see anything interesting, but I still have to wade through those data.

But there's a lot here. And I think there's -- there's a lot to mine that I'm hoping -- and I'm hoping

that we'll start doing some of those analyses. So I'm really excited that we have another student project in the works.

CHAIRPERSON SCHWARZMAN: Phthalates and PBDEs specifically --

DR. MANN: I am --

CHAIRPERSON SCHWARZMAN: -- are those analyses started, or underway, or anything?

DR. MANN: I've seen some descriptive analyses on the web, and that is it -- or, sorry, in our shared-drive.

I -- we do have one person who still works in the Environmental Health Investigations Branch that was very active on BEST. It's been really, really helpful to have her historical knowledge.

CHAIRPERSON SCHWARZMAN: I think we have -- if there's any other questions from the audience or the Panel?

Veena, you have a question.

PANEL MEMBER SINGLA: Hi. Thanks so much for that very informative presentation. It's very interesting work. I have a comment and a question. I think it's really great this is a collaboration with Kaiser. And I wondered if there was any plans to present on the results to the physicians and health professionals there at Kaiser? I feel like it would be very informative and

valuable for them to understand more about the chemical exposures their patient population is experiencing. So just a thought there.

And a question on whether -- I know there's still a lot of data analysis to be done just with the information you have now, but if there's any plans in the future to look at the health medical or health records of the patients, and do any -- look at any associations or outcomes there?

DR. MANN: So we have talked with Stephen Van Den Eeden about looking at health outcomes and he says it's conceivable that we could link our data with health outcomes, as long as they are things that are commonly measured in any clinical visit. And I like -- I think your idea to present these data to Kaiser is a really, really good one.

Thank you.

DR. WU: Can I add something to that?

CHAIRPERSON SCHWARZMAN: Yeah, Nerissa.

DR. WU: I just want to add that we'll be talking about this a little more in the afternoon. But Environmental Health Investigations Branch, not limited to biomonitoring, does get a lot of cases coming across our desks from physicians, from poison control, from counties and local health officials. And one of the things we've

been thinking about is doing a CME course or some kind of educational course for physicians to talk about metals, because there's clearly a lot going on, both from products and other exposures.

And it would be great to just make our resources known to people, but also get people more up to speed on what we're looking at.

CHAIRPERSON SCHWARZMAN: Great. Other -- we'll have some time for discussion.

Other questions?

Okay. Then we'll move on -- thank you so much for that, Jennifer. It's really excellent to see these results.

We'll move to our next presentation. By Lauren about the ACE program.

(Thereupon an overhead presentation was presented as follows.)

MS. BAEHNER: Oh, there we go. Okay.

So good morning. I'm going to tell you a little bit about the metal results we saw in our ACE Project. It's the Asian/Pacific Islander Community Exposures Project.

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MS. BAEHNER: So As Jennifer mentioned, some of the motivation for this project came out of the metals

data from BEST. But a lot of the interest came from our community partners, including APA Family Support Services, as they've done a lot of work on education around fish and mercury within their community.

And collaboration with our community partners was essential in all phases of ACE from study design, to recruitment of participants, to data collection in the field, and dissemination of our findings.

There were two phases in ACE, ACE 1 and ACE 2. And in each phase we recruited 100 participants, who were 18 years of age, had lived in the San Francisco Bay Area for the prior year, and who self-identified as at least partially Chinese in ACE 1, or Vietnamese in ACE 2.

Blood and urine samples were measured for four metals, arsenic, cadmium, lead, and mercury. And the perfluoroalkyl substances and polyfluoroalkyl substances or PFASs.

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MS. BAEHNER: Our community partners were APA Family Support Services in ACE 1, and the Vietnamese Voluntary Foundation in ACE 2. Samples were collected in 2016 for ACE 1, and 2017 for ACE 2.

Exposure questionnaires were verbally administered in the preferred language of each participant. And for each phase, we collected 100 urine

samples. And in ACE 1, 96 blood samples, and 99 blood samples in ACE 2.

Our overall results return packets, which were produced in the preferred language of the participant, went out very recently. So for ACE 1, they went out in August of last year, and ACE 2 just a few months ago.

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MS. BAEHNER: The ACE exposure questionnaire was used to collect information on demographics, diet, occupation and industry, use of personal care product usage, other activities like welding and metal working, and smoking status. And, in particular, there are extensive questions on rice and fish. There were 18 questions on rice consumption, and 26 questions about fish. We also asked about other food items such as seaweed, candies, spices, supplements, and traditional remedies or medicines.

This was the first time that we had used such an extensive questionnaire, and one that was tailored specifically to our study population. A team worked to develop questions that would get at the dietary habits and other characteristics that might be specific or unique to our particular population.

And with this extensive questionnaire, we have a lot of very rich data that about potential exposure

sources. And so because we only recently returned our results return, we're in the beginning steps of analyzing this data.

And for more info on the exposure questionnaire, as was mentioned, it's posted online, and I think there's a copy outside, in case anyone wants to see it.

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MS. BAEHNER: So this slide was shown in our last meeting, but it summarizes some of the demographic characteristics in both ACE study populations. I'm only showing here characteristics where the differences between ACE 1 and 2 were significant.

So in ACE 1, participants tended to have a higher income and a higher education level. And in ACE 2, we found that participants -- more participants tended to be more recent immigrants.

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MS. BAEHNER: So similar to what Jennifer showed in BEST, I'm showing the geometric means of the three blood metals and three urinary metals that we measured in ACE. The format is similar in all of these -- excuse me -- with the geometric mean for ACE 1 on the far left, followed by ACE 2, then NHANES all races, 20 years and older, and then finally NHANES Asians on the far right. And the year of sample collection is noted beneath each

group.

And I'm really just showing this to give you a sense of how the ACE metal levels compared to the NHANES comparison groups. And so the first slide is blood mercury. And you can see that both ACE 1 and 2 had higher mean levels of blood mercury than either of the NHANES comparison groups.

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MS. BAEHNER: The next slide shows the levels of blood cadmium. And again, you can see ACE 1 and ACE 2 have higher levels of blood -- sorry, blood cadmium than the NHANES comparison groups.

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MS. BAEHNER: And we have the mean levels of blood lead. And ACE 1 and ACE 2 had higher mean levels of blood lead than NHANES all races, but not NHANES Asians.

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MS. BAEHNER: And now I'm going through the urinary metals. This first slide is the urinary inorganic arsenic. And ACE 1 and 2 had much higher levels of inorganic arsenic than both NHANES comparison groups.

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MS. BAEHNER: The next slide is the geometric means for creatinine-adjusted urinary cadmium. And again, ACE 1 and 2 have higher mean levels of urinary cadmium

than comparison groups.

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MS. BAEHNER: And the last urinary metal was mercury. And ACE 2 had a higher mean level of urinary mercury than ACE I and both NHANES comparison groups.

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MS. BAEHNER: So for the four metals measured in ACE, biomonitoring has adapted levels of concerns, or LOCs as I'll refer to them. And they're set primarily by the CDC with the blood -- blood lead LOC set by CDPH.

When we have a participant that has a metal level exceeding that LOC, it triggers an early notification protocol. And for arsenic that can include further analyses to determine the levels of organic and inorganic arsenic species as was mentioned.

And for all metals, staff sends the participant a letter with their elevated result or results, along with the LOC and information about that metal, such as where it can be found, some of the health concerns, and steps that people can take to reduce their exposure.

It often also includes calls to participants, where we go over the letter by phone. And we use a follow-up survey in order to ask additional questions, try to identify their exposure source. And I think those surveys are some example surveys for arsenic and mercury

are posted online.

We make the calls at times when -- oh, and I should say this is also an important opportunity for participants to ask us questions about their results.

And we make the calls when we think we can most reach people, including evenings and weekends. And calls are conducted in the preferred language.

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MS. BAEHNER: So this slide lists out the LOCs for each metal. And we calculated how many participants had an exceedance of each metal for both ACE 1 and 2. And we expected to see higher levels of metals in ACE, but we were really surprised at the number of participants with exceedances, including exceedances of more than one metal.

And so because of this, we decided to conduct an initial screening analysis to compare groups of participants with exceedances to those without exceedances to see how they would differ. The majority of exceedances were in arsenic and mercury, which is what I'll focus the rest of my talk on.

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MS. BAEHNER: And so I've broken up the exceedances by metal. And so I'm showing arsenic first with the total arsenic exceedances. And these are - sorry - percentages of participants within an exceedance of each

metal. So total arsenic is in the first line, and then inorganic arsenic below.

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MS. BAEHNER: We also calculated exceedances for the BEST populations that Jennifer described. And so when you add in Pilot and Expanded BEST, you can see the ACE 1 and 2 had a higher percentage of participants with an arsenic -- an inorganic arsenic exceedance.

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MS. BAEHNER: Excuse me.

Here are the exceedances for mercury with blood mercury in the top few rows and urinary mercury below. I've listed all blood mercury exceedances, and then I've broken it out into two different groups, because the LOC for each of those groups is different. So women between the ages of 18 and 49 have a lower LOC because of the potential risk if a woman is pregnant.

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MS. BAEHNER: And so when we added in the exceedances for BEST, again we can see that in ACE 1 and 2 there were a higher percentage of participants with blood mercury exceedances. And so this data that I'm showing on blood mercury, along with the arsenic data, really shows that ACE study participants were more highly impacted than BEST. And with blood mercury and arsenic, these are a

real public health concern.

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MS. BAEHNER: And so this next slide shows percentages of participants in each study, who had an exceedance of one or more metals. The top row is the number of -- or, I'm sorry, the percentage of participants that did not have an exceed of any metal, followed by one metal, two metals and even three.

And again, we can see that our ACE Study populations were much highly -- more highly impacted than the BEST Study populations. And this table highlights, A, the impact to individual participants, and also the work of our program as we use our early notification protocol.

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MS. BAEHNER: So once we saw the high number of exceedances in ACE, we wanted to find out more about these participants.

We first grouped participants with an exceedance of any metal and compared them to participants without any exceedance. And we looked at a number of variables from the exposure questionnaire, including demographics, immigration characteristics, and diet characteristics.

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MS. BAEHNER: And so first, I'm showing the exceedances and non-exceedances in ACE 1 and then in ACE

2. I'm only showing variables where the difference between exceedance categories was significant, and those are bolded in black.

And so in ACE 1, participants with any exceedance were more likely to complete the interview -- the sample collection interview in a language other than English.

And in ACE 2, participants had a lower level of education -- participants with an exceedance had a lower level of education than participants without an exceedance.

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MS. BAEHNER: Here's some additional variables, again only showing variables where the difference in exceedance groups was significant. In ACE 1, participants with exceedances of any metal reported that they ate fish more frequently than participants without exceedances.

And in ACE 2, participants with any exceedance reported having spent a smaller portion of their life and fewer years in the United States than participants without an exceedance.

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MS. BAEHNER: And so the results I just showed you tells a little bit about participants with exceedances, but we wanted to take a closer look, particularly at participants with an exceedance of blood

mercury and urinary inorganic arsenic alone.

So to do this, we grouped participants with an exceedance of blood mercury and compared them to participants without that exceedance, and grouped participants with an exceedance of inorganic arsenic and compared them to participants without that exceedance.

--o0o--

MS. BAEHNER: And so this is the data for the blood mercury exceedance groups, again only showing variables where the difference between groups was significant. And in ACE 1, participants with a blood mercury exceedance, again were more likely to have completed the interview in a language other than English.

And in ACE 2, participants with a blood mercury exceedance were more often female and had a lower household income than participants without a blood mercury exceedance.

--o0o--

MS. BAEHNER: These are some additional variables for the blood mercury exceedances. In ACE 1, participants with a blood mercury exceedance had spent fewer years in the United States and reported eating fish more frequently than participants without a blood mercury exceedance.

And in ACE 2, participants with a blood mercury exceedance were younger and also had reported fewer years

in the United States and eating fish more frequently than participants without that exceedance.

--o0o--

MS. BAEHNER: And finally, I'm showing you the data for the inorganic arsenic exceedances. In ACE 2, participants with an inorganic arsenic exceedance reported having spent a smaller portion of their life and fewer years in the United States than participants without that exceedance.

And in this initial screening, these were the only variables where the differences in exceedance groups were significant for inorganic arsenic.

--o0o--

MS. BAEHNER: So this initial screening analysis that I'm presenting today is really just the first step at looking more closely at participants with high metal levels. And we will continue our analyses to examine the relationship between a metal exceedance with additional characteristics that are known to be associated with exposures, such as the use of traditional remedies, specific types and sources of rice and rice products, and specific types, sources, and parts of fish.

And we'll also do some more in-depth analyses to model the relationship between metal levels and some of our other characteristics, like demographics and diet.

But I also want to say a few words about what we've learned in talking with our participants in these early notification calls. We've learned a lot that we hope to apply to really help evaluate and improve our follow-up protocol.

For instance, we're not always able to reach participants. Either our participant's phone number has changed, suggesting that some of this population might be more mobile. In other instances, we were just not able to reach the participant, and they did not call us back.

And when we speak with participants, there was a very wide range of reactions, from people who are -- you know, appreciate the call, but aren't particularly concerned about their result, to people who are very worried about what their result means for their health.

And we've also had a case with a highly elevated result for inorganic mercury. And when we followed up with this participant in their preferred language, we tried to identify their exposure source by using our follow-up survey. And when the interview did not shed a whole lot of light on the potential source, we offered to come to their home directly to investigate what the source might be.

In this case, the participant did not want us to follow up with them further, even after we explained the

dangers of this particular exposure. And while this is only one case, it does highlight some of the hurdles that we face in following up with biomonitoring results.

So the results of our screening analysis, along with what we've learned with talking with participants, are helping us think about how to better design and target our messages. And I think as Nerissa mentioned, this goes beyond biomonitoring, as we do get a lot of cases of mercury and other metal exposures in EHIB. And EAS, Exposure Assessment Section, tries to be a resource to these cases.

--o0o--

MS. BAEHNER: So I just want to -- well, first, I want to thank ACE Project participants for taking the time to be a part of our study. They donated a blood and urine sample to us, and share their experiences and information with us through the exposure questionnaire. Without them, we can't do this work.

I also want to thank our community partners, APA and VIVO, and really thank them for their input and hard work in this project, and in ongoing work as we try to translate biomonitoring messages -- or biomonitoring results into meaningful messages. And then, of course, Biomonitoring California staff who have worked on this project.

So with that...

CHAIRPERSON SCHWARZMAN: Great. Thank you so much, Lauren.

MS. BAEHNER: Yes.

CHAIRPERSON SCHWARZMAN: We have -- we're doing fine with time just for everybody's -- feel too rushed. And we have time for questions to Lauren, and then we'll have a half hour for discussion. And while everyone is shuffling papers, I'll ask a question --

MS. BAEHNER: Sure.

CHAIRPERSON SCHWARZMAN: -- which is it's really interesting to see this analysis of the group with -- groups with exceedances versus non-exceedances. And I kind of summarized the factors that were associated with any exceedances --

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: -- like education, time in U.S., fish consumption, non-English language --

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: -- female and decreased -- lower income.

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: And I wondered if you've looked yet at whether those factors differ between the ACE population and the BEST population, and whether you can

tell what might drive that difference between the findings in the two studies?

MS. BAEHNER: I -- we -- I have not looked at them compared to the BEST populations. And I don't -- I'm not sure how much that has been looked at within the BEST to be honest. Maybe somebody else can better answer that question, but I think that is a good idea.

CHAIRPERSON SCHWARZMAN: I saw Jennifer nodding vigorously.

DR. MANN: Good idea.

CHAIRPERSON SCHWARZMAN: Good idea.

MS. BAEHNER: It's a good idea.

CHAIRPERSON SCHWARZMAN: Great.

Questions from the Panel?

Yes, Tom.

PANEL MEMBER McKONE: Very interesting. Thanks for the presentation. The question I have is early on in the profile of the population, the household income is actually quite low for a lot of them. It's below the poverty line. And I guess the question is -- and again, you saw income as a factor, but I also wonder how much is that a factor in making it difficult to do follow up? Because then again, I'm sort of surmising a bit, but I think people who are right around the poverty limit probably are struggling with where they live, and are

going to move frequently, or may not have a home at all. I mean, you start the study and then you can't find them.

So I don't know if the fact that you had a lot of people right at the poverty or very close to the poverty limit put at jeopardy the ability to follow up the population?

MS. BAEHNER: I think that's an interesting point. I mean I can't say if that was the direct reason or not, but we did have some difficulty in reaching participants in our follow-up protocol.

And off the top of my head, I mean, I think we were able to reach a number of people. But oftentimes, we would find that a phone number was no longer in service. And so, yeah, I mean, I think people's phone numbers did change a lot more frequently.

CHAIRPERSON SCHWARZMAN: Other questions from the Panel?

Is that Oliver? Were you making movement?

Yeah.

PANEL MEMBER FIEHN: I wanted to know if you have details about the people who exceeded the different metal levels in the BEST Study, were these also mostly Asian/Pacific Islanders?

MS. BAEHNER: You know, again, that's a good question. I did not look at that. I don't know if that

has been looked at in the past or not, at least not in this way.

CHAIRPERSON SCHWARZMAN: I might refer you to Jennifer's slide number 19, the numbers are super small in here.

(Laughter.)

CHAIRPERSON SCHWARZMAN: That's the breakdown by race and ethnicity. And this --

MS. BAEHNER: Okay.

CHAIRPERSON SCHWARZMAN: And it is not probably the same measure of exceedance, is that right? It's not like exceedance of one, versus two, versus three? But -- so it's not directly comparable, but --

MS. BAEHNER: No.

CHAIRPERSON SCHWARZMAN: -- you can see that for blood mercury, urinary mercury, and total arsenic, API is elevated compared to non-Hispanic whites for all of those, right?

MS. BAEHNER: Yep.

PANEL MEMBER FIEHN: So then it appears to be really an ethnic issue.

MS. BAEHNER: I mean, I think there's probably a lot of factors there, and that's something that we'll definitely continue to look at.

CHAIRPERSON SCHWARZMAN: I had an additional

question about the future analyses.

MS. BAEHNER: Sure.

CHAIRPERSON SCHWARZMAN: And I noticed that you had in the questionnaire issues about occupation and welding, metal working.

MS. BAEHNER: Right.

CHAIRPERSON SCHWARZMAN: Do you have enough data to include that in your future analyses?

MS. BAEHNER: That's a good question. I think we do have questions about specific types of occupation, in terms of how that distri -- the distribution is among those questions. The number might be a little bit small, but that's something we'll definitely take into account.

CHAIRPERSON SCHWARZMAN: And I almost wonder if some of that might correlate with some of the other factors that you're finding associated, like income level -- where low income can correspond to lack of --

MS. BAEHNER: Sure.

CHAIRPERSON SCHWARZMAN: -- occupation or it can correspond to certain --

MS. BAEHNER: Certain types of occupation.

CHAIRPERSON SCHWARZMAN: -- jobs that are more -- a higher likelihood of exposure.

MS. BAEHNER: Yeah, definitely. That's something --

CHAIRPERSON SCHWARZMAN: Anyway, I'd just be curious about that and whether it can make your list of future analyses?

MS. BAEHNER: Yeah, definitely. That's something we'll take into account.

CHAIRPERSON SCHWARZMAN: Other questions?

No.

Yes, Eunha

PANEL MEMBER HOH: Just a question. Is there any reason to select the Chinese, or partially Chinese, or partially Vietnamese?

MS. BAEHNER: I believe the ACE Project really came again from data, but also the motivation -- or, I'm sorry, the interest of APA Family Support Services, they'd worked for a long time with their community, and I believe they work primarily with Chinese-Americans in San Francisco. And so I believe that was -- we wanted to do a community-specific study that would really look at body burden of mercury.

CHAIRPERSON SCHWARZMAN: Any other questions from either the panel or the audience for Lauren before we let her off the hook?

Yeah, Veena.

PANEL MEMBER SINGLA: Thank you for that presentation. Very interesting results.

And I -- forgive my ignorance on this, in terms of exposure sources, I know for lead that housing characteristics can have a significant impact. And I just wondered for the other metals if there was any known associations with housing characteristics?

MS. BAEHNER: With housing, I mean, definitely lead comes to mind. I'm not aware of any other particular housing characteristics that would impact exposure, but that's something we can definitely look at.

Yeah, housing characteristics.

CHAIRPERSON SCHWARZMAN: Proximity to roadways maybe?

MS. BAEHNER: Perhaps.

CHAIRPERSON SCHWARZMAN: For soil deposition of lead.

MS. HOOVER: This is Sara. I think that's an interesting question. I mean, we research each metal in detail about what are the most likely sources, and we just did an update of all of those. So actually, the sample packet you have are the old fact sheets. We did a major update in this part of CARE. So nothing is jumping out in my mind, but I think it's an interesting question.

I also just wanted to follow up a little bit more on Eunha's question. So as Lauren had mentioned, part of it was motivation of BEST. The other motivation though

was the fact that it's known that Asians are, you know, more highly exposed. And that's been shown, but not sufficient data on subpopulations of Asians, so sort of grouped Asians.

But these studies allowed us to look specifically at Chinese, specifically at Vietnamese, and really generating some new information that adds to the body of knowledge quite significantly.

MS. BAEHNER: And there was one thing I wanted to mention was that some of the results around age, language, and time in the United States, I think really does highlight the importance of our follow-up services and educational messaging being culturally and linguistically appropriate. So I just wanted to add that.

CHAIRPERSON SCHWARZMAN: I'm just -- I had one other thought --

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: -- about this difference between ACE and BEST population.

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: It's interesting to me that the recruitment pool was so different, right? There's Kaiser patients versus just Asian --

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: -- you know Chinese or

Vietnamese immigrants, or Chinese- or Vietnamese-Americans in San Francisco.

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: So that recruitment pool is really different. I would be very interested to see if that bears out on the population characteristics that are associated with higher risk of exceedances.

MS. BAEHNER: Um-hmm. Yeah, definitely. Yeah, and we did use a very different recruitment sample, so yeah.

CHAIRPERSON SCHWARZMAN: Okay. Thank you so much, Lauren --

MS. BAEHNER: All right. Thank you.

CHAIRPERSON SCHWARZMAN: -- for that helpful presentation.

MS. BAEHNER: Yeah.

CHAIRPERSON SCHWARZMAN: We now have time for a general discussion of the topics and talks from this morning, and that can be both from the Panel and from the audience, we'll do a sort of formal check for public comment at some point in this. But a reminder that if you're listening in on the webinar, you can send questions to biomonitoring@oehha.ca.gov, or -- questions or comments and we'll read those as it comes along.

Oh, good. That's up on the screen now.

Anyone want to start?

Tom.

PANEL MEMBER McKONE: Well, it's more -- it's a follow-up on the issue of exposures changing when they come to the U.S., and the one is -- I mean, I think uranium is an interesting case. And I bring this up because it's like 30 years ago my dissertation was on the biogeochemistry of radionuclides, something interesting. So unless you live near a uranium mine or a nuclear melt down --

(Laughter.).

PANEL MEMBER McKONE: -- which is pretty rare, most of the uranium that you would find in an individual is coming from food and water. And it's granitic, granite type, soils that have the highest uranium, and -- but it's also sensitive not just to the type of soil -- the soil origin, but also the EH, oxidation reduction, and the pH of the soil that liberates the -- so the interesting thing, I mean, you would expect people who come from -- now, I don't know where the people come from, but if they're coming from a country with granitic soils, which is true of areas with very thin -- like parts of Asia have a very thin topsoil layer, and it's a granite origin soil.

In the U.S., we have sediment origin soils. They're wonderful, rich, loamy soils, like in the midwest,

and even in California. So our uranium levels are quite low. It's actually a country where you would expect the food supply. Now, that's things that are produced in the U.S. Some of our food comes from other places.

But in general, our groundwater, there's some isolated spots where it's higher. But, in general, our groundwater plants are low in uranium. I guess, it's the one good news story.

CHAIRPERSON SCHWARZMAN: Other comments?

Eunha.

PANEL MEMBER HOH: Yes. It's more a question. But did you find anything about this fish consumption data and the mercury kind of significance? I kind of see some, but I think it will be interesting to hear.

MS. BAEHNER: Yes. In the analysis that we've done so far, when we looked at participants with exceedances of blood mercury, we found those participants had reported eating fish more frequently. And that is in line with what we know about mercury in fish, and we kind of expected to see that.

PANEL MEMBER McKONE: Just to probe a bit more on the fish issue. So mercury levels in fish vary tremendously --

MS. BAEHNER: Right.

PANEL MEMBER McKONE: And a lot -- I'm assuming a

lot of the Asian, especially the ones that are in the poverty level are catching fish out of the bay or off of bridges, I mean, locally. So is there a way to find out what fish species they're eating. Are they really eating the ones that are high in mercury?

MS. BAEHNER: Yeah. That's definitely something that we're going to look at. In the questionnaire, we have extensive questions about types of fish, where they're most frequently eating fish, whether it's restaurants, stores, street sellers, or we also have questions about fish that are caught locally. And then within those categories, what are the most frequently -- what are the types of fish that are most frequently eaten.

So we'll definitely be able to look a little bit at that. And also, yeah, definitely parts of fish, like fish organs, or fish skin, or fish eyes, for example.

CHAIRPERSON SCHWARZMAN: Ulrike.

PANEL MEMBER LUDERER: Can you hear me?

Okay. Great. Thank you.

I want to also echo that is a really great, very interesting, and wonderful work the Program is doing.

MS. HOOVER: Closer.

PANEL MEMBER LUDERER: Closer?

MS. HOOVER: Yes.

PANEL MEMBER LUDERER: Okay. All right.

So kind of getting back -- I mean, we -- so, no, it's not surprising, and that's why you ask all those questions about fish consumption and what kind of fish that that -- that large -- high consumption of fish is associated with elevated blood mercury concentrations. And also, you know, it's great too to see in the questionnaire all the questions about rice consumption and the association with inorganic arsenic.

And I was wondering whether you've been able to get a sense, working with these community groups, how much awareness there is of those, you know, associations? I mean, obviously following up with the individuals to tell them. I mean, you can get a sense from them, but I was wondering if you have also kind of in the larger community, and whether part of the plan, you know, might be are you going to do kind of follow-up, I don't know, presentations with the community groups maybe --

MS. BAEHNER: Right.

PANEL MEMBER LUDERER: -- or assist them in getting the word out, if maybe it's not --

MS. BAEHNER: Yeah, I think --

PANEL MEMBER LUDERER: -- that people aren't aware of it, or is it -- sort of one more part of that is or maybe people are aware of it, but it's -- you know, there might be economic reasons why they're not able to,

you know, say buy rice that's from, you know, places where it's known to have less arsenic in it --

MS. BAEHNER: Um-hmm.

PANEL MEMBER LUDERER: -- or, you know, buy fish that -- of less mercury.

MS. BAEHNER: Yeah, definitely. I think those are good points.

So the first part of is there kind of a more -- a greater awareness of mercury and fish in particular? I can talk a little bit about that. I know that, especially with ACE 1 working with APA, they had worked on that issue as an organization and with their community for a number of years and were really interested in this type of study. So that awareness I think is there, to some extent.

And then when we talk to individual participants, some participants have kind of some idea of it. But for others, it is kind of new information that we're sharing.

And then, I think the last part of your question how we're going to share these more widely? In ACE 1, we had a community meeting where APA worked with us to invite the community at large, and we went over some of these study findings. And we're working with the results from ACE 2 to do a similar type of meeting.

But, yeah, we definitely are really interested in

getting this message out more broadly.

PANEL MEMBER HOH: So just following up, I've been working on some like seafood diet and persistent organic pollutants in breast milk kind of project I've been working on. It's fascinating that I was thinking about mercury as well, you know, that we found in significant like seafood consumption and then persistent organic pollutants in the breast milk. So this study is pretty interesting, because the mercury also is pretty abundant in fish.

MS. BAEHNER: Um-hmm.

PANEL MEMBER HOH: One thing that -- I'm a Korean, you know, so -- so no matter what their incomes are, you know, when people come here as an adult, they have some kind of ideas about their food, you know.

MS. BAEHNER: Um-hmm.

PANEL MEMBER HOH: So it might be something that could be also related to like they buy some rice from -- with certain brand --

MS. BAEHNER: Um-hmm.

PANEL MEMBER HOH: -- or certain source, which they think it's good for them or something, you know.

MS. BAEHNER: Um-hmm. Sure.

PANEL MEMBER HOH: So I think it's something very cultural issues going on together.

MS. BAEHNER: Yeah, I mean, I think that's a good point. And in our messaging, you know, we really try to encourage people that if they are interested in lowering their levels or their exposure, that they at least just try to have some variety in, for example, types of rice, or where the rice is sourced from, because it is hard to tell people, no, don't eat a certain thing.

PANEL MEMBER HOH: And then one more thing that we --

MS. BAEHNER: Yeah.

PANEL MEMBER HOH: -- is that the data -- the data analysis that we found in my study -- in my project --

MS. BAEHNER: Um-hmm.

PANEL MEMBER HOH: -- we found that we collaborated with a biostatistician that he brought a really interesting novel type of analysis. It's called LASSO or something. But it's sort of like in a way the small data set that can still see the trend --

MS. BAEHNER: Um-hmm.

PANEL MEMBER HOH: -- you know, what -- even though they don't -- we don't see the significance in the very conventional statistical analysis. But with that kind of novel analysis, statistical analysis, they were able to see the trend with the small set of relatively not

large set of data. So something that I think will be interesting to delve into the data.

MS. BAEHNER: Yeah. Yeah. Thank you. That's something we can look at.

CHAIRPERSON SCHWARZMAN: Carl.

PANEL MEMBER CRANOR: Yes. Thank you. You talk about the exceedances. With respect to mercury, there's been a lot of work done

THE COURT REPORTER: Closer to the mic.

PANEL MEMBER CRANOR: Closer. Okay.

How close is this to really worrisome levels? I mean, I -- friends of mine have done work in the Faroe Islands, probably pretty bad there, because women have had to change their traditional diets, so that they give birth to children that don't have -- they're not on the way to brain damage.

MS. BAEHNER: Um-hmm.

PANEL MEMBER CRANOR: And so I'm wondering -- so that's very bad. What are you seeing how far is it from very bad?

MS. BAEHNER: I think that's an interesting question. We see, you know, a range of results from right around where our LOC is set, and those are really meant to be protective. And we do kind of have a way to break, at least for our blood mercury, the extent of the risk based

on their results.

And does -- yeah, in terms of the -- relative to the LOC, the range might be -- this is off the top of my head, but maybe double the LOC. So we're not seeing anything that is, you know, a really significant concern with blood mercury, where we need to take further immediate action. It's more we want to let these individuals know the results, so that they can take some individual action.

PANEL MEMBER CRANOR: So you're not seeing levels close to the Faroe Islands. I mean, I don't know if you're aware --

MS. BAEHNER: No.

PANEL MEMBER CRANOR: -- of those things.

MS. BAEHNER: No, definitely not, yeah.

CHAIRPERSON SCHWARZMAN: Other comments or discussion items? We can go beyond these study results.

PANEL MEMBER SUÁREZ: I have a question about --

CHAIRPERSON SCHWARZMAN: Yeah, José.

PANEL MEMBER SUÁREZ: Just one more question.

So I'm looking at just the differences by sex. So I see in both ACE 1 and ACE 2, it's a pretty consistent message, even the ACE 1 is significant but maybe it's just -- maybe it's just a power issue. Have you thought much about that? Are there consumptions different for

fish between males and females that could be potentially explaining the differences and have you looked at that?

MS. BAEHNER: We have not looked at that yet within ACE. From what I'm remembering, I think they tended to be more female participants, but that is something we could take a look at. I'm not aware of any particular trends, but --

PANEL MEMBER SUÁREZ: Yeah, I mean, it just shows that there's --

MS. BAEHNER: -- in terms of fish consumption.

PANEL MEMBER SUÁREZ: -- substantial differences there across those that have the higher exceedances for mercury, so it would be really important to --

MS. BAEHNER: Yeah, that's true within blood mercury.

PANEL MEMBER SUÁREZ: -- dig a little bit further into that.

MS. BAEHNER: Yeah, definitely.

CHAIRPERSON SCHWARZMAN: I'm curious, because metals are so significant in terms of developmental toxicants, neurotoxicants particularly, whether either of these studies had any pregnant women? There's probably not the power there to look at that. What was the -- I mean, you have a child-bearing age category --

MS. BAEHNER: Um-hmm.

CHAIRPERSON SCHWARZMAN: -- but not actual child-bearing status.

MS. BAEHNER: Yeah, we did not ask in ACE, and I don't think in BEST either. I don't think we asked that question

MS. HOOVER: Go to the mic.

DR. MANN: Yeah, I'm trying to remember -- this is Jennifer Mann speaking. I'm trying to remember what the specific questions were around pregnancy in BEST. They were there. I don't believe -- I'm not sure if we asked if the were pregnant at the time. But we'd asked the number of pregnancies they'd had. Just trying to remember, because I vaguely seeing a freque -- do remember seeing a frequency of pregnancy and it was pretty low, like people that might have been pregnant, so we may have asked that question. I think it was low. And you saw the skew in BEST was toward older people. Median age was 48, so...

CHAIRPERSON SCHWARZMAN: Thank you.

Yeah, Carl.

PANEL MEMBER CRANOR: One more follow-up question. I know that the people that have done the studies in the Faroe Islands seem to have identified a gene or genes that make people more susceptible. You probably haven't gone there, but it may be worth looking

at.

MS. BAEHNER: No, we definitely have not gone there. And I think that is very interesting, but it's not something that I think we can address in biomonitoring.

CHAIRPERSON SCHWARZMAN: Any points from the audience? Maybe I should officially call for public comment and see if there's anything on the web?

MR. BARTLETT: Nothing on the web.

CHAIRPERSON SCHWARZMAN: Nothing on the web.

Okay. If -- maybe I'll take one other moment and just before we move on to our short topic before lunch, ask for last questions from any -- or not necessarily questions, but discussion points from any Panel members?

MS. HOOVER: This is Sara Hoover. I just also wanted to highlight again, Lauren mentioned and Nerissa mentioned, one of the opportunities we took for this item was to finally get some of our materials on the web, which I hope and think will be a resource for many other programs. We had a lot of inquiries about our exposure questionnaire. If you had chance to look at -- I shared it with the Panel yesterday, and our guests discussants, and there's a sample packet on the table, and it's now posted.

But really I think the ACE questionnaire was amazing. It's really quite a triumph of research and work

and illustrative pictures. It's pretty amazing that we have this incredible resource. And as Lauren mentioned, our policy is also that we don't start publishing papers and all, until results are returned. So we've just done that for ACE 2. So now it's our opportunity to really start delving into the data.

So on the web now, we have that exposure questionnaire posted, the pictures posted, also two of our follow-up surveys that we use, and then a mock results return packet. So it's -- I encourage people to take a look at that, and just remember, if you don't have comments today, you're always free to email us at any time, including the Panel, to send us comments offline. Just don't email each other. But other than that, you're welcome to send us input at any time.

CHAIRPERSON SCHWARZMAN: Great.

So we'll pick up a few minutes for lunch, which is always nice. Before we break for lunch, we have one quick agenda item, which is that a topic that came up not last meeting, but the meeting before, but it's a topic that comes up periodically on the panel is whether the panel can do anything in a sort of more formal way about kind of requesting resources that we see lacking for the Program support.

And at various times in the past, the Panel --

some Panel members have written letters sort of expressing the trust and faith in the Program and wishes for future support. So we have prepared -- I have prepared another letter like that. And with some support from another -- one other Panel member as permitted under Bagley-Keene, Veena Singla.

And so that letter is available today for any other Panel members to sign, who would like to support that. And there is -- we'll have copies for the Panel members to look at here during lunch. And then a single copy that you would sign. So we have several copies that you can read, so not everyone is trying to read the same copy, but just make sure not to sign -- I actually marked them don't sign this one, so that all signatures, if you're interested in signing it, go on the same version.

And there is also a copy of the letter at the table in the front, so it's available for the public to read. And that can all happen during lunch.

So I'm just looking to Sara to make sure we don't have to do anything else before we break.

Yeah.

PANEL MEMBER McKONE: I have a question. Is there a signature line with our name on it or we just sign wherever we can fit our name in.

CHAIRPERSON SCHWARZMAN: I didn't presume that

all Panel member would want to sing, so there's no signature -- you'll have to sign and write your name.

PANEL MEMBER McKONE: Okay.

CHAIRPERSON SCHWARZMAN: It's signed and print but me and by Veena, because we've worked on it.

Question, Carl.

PANEL MEMBER CRANOR: Yes. We've had -- we will now have a change of Governors. And it's been difficult, I know in conversations with various people, to jar a little extra money out of Governor Brown. We have a new Governor. Maybe that would make a difference. I don't know.

But Jerry Brown was pretty tight with his fist. Maybe there will be -- and this isn't a huge amount of money probably what the Biomonitoring Program needs. So it's a good time to ask.

CHAIRPERSON SCHWARZMAN: Well, I think that's just sort of prerogative of any individual Panel member. If you have some place that you want to do some advocacy, that's completely up to you. It's not coming from the Program. It would be coming from us as individual Panel members.

And one thing that I'm considering is, you know, we were each appointed by different people, and that person is invested in your role on the Panel, and your

input to the Program. And so that might be a point of contact for you if you want to share the letter with your appointing authority. But I'm not requiring that anybody do that, but just that's sort of what I'm intending.

PANEL MEMBER McKONE: So as a comment, or sort of a thought, that it might be useful -- I mean, you talk about writing letters. So it might be useful for us to write a letter to the new Governor introducing ourselves, explain what we do. I mean, it will go through the channels, but I don't -- maybe he knows.

But it might be useful just to say this is who we are. I think we're doing something really important. Now, it may be the whole Panel, or it may be just Governor appoint -- I'm one of the Governor appointees. And Schwarzenegger originally appointed me, and then Brown appointed me twice. So -- and there wasn't a lot. I mean, it just went right through.

But maybe it is a good idea for those of us who are Governor appointees to sort of point out here we are, and this is what we do, and -- just so you know that we're one of your Governor appointees. And then draw some attention to the Committee.

CHAIRPERSON SCHWARZMAN: All right. I think that's an interesting idea. And if you wanted to spearhead that as a Governor -- I'm not a Governor

appointee. I'm Speaker of the Assembly appointee -- but to write such a letter. And I would just remind you that you can recruit one other Panel member to work on it with you, but -- and then you would present it publicly for think other Governor appointees to sign on, if they wanted. So just as a reminder.

Any other thoughts or questions?

Veena.

PANEL MEMBER SINGLA: I'll just follow up on the comment I made this morning about the report to the Legislature. I do think that's a -- it's a great opportunity to engage the Legislature and the administration on the Program and its accomplishments. So I'll definitely look forward to updates once there is more information on when those might be coming out.

CHAIRPERSON SCHWARZMAN: Okay. So the -- I'll put out the letter here. The letter available for the public is already on the front table, but for -- during lunch.

And so we can adjourn early and gain some time for lunch. You don't want to resume early, do you?

MS. HOOVER: No.

CHAIRPERSON SCHWARZMAN: Yeah. We'll just gain some time for lunch. So we're going to reconvene promptly at 2:25. The CDPH cafeteria I think, as most panelists

know, is right here outside the auditorium. And so that's an easy, quick place to go.

And for Panel members, just a reminder to comply with the usual Bagley-Keene requirements and refrain from discussing Panel business during lunch and the afternoon break.

So with that, we will convene the morning session and break for lunch and reconvene at 2:25. If everyone can be here and ready to go at 2:20, that would be helpful.

Thank you.

(Off record: 1:01 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: 2:28 p.m.)

CHAIRPERSON SCHWARZMAN: Okay. So we're going to open the afternoon session. And I'm going to give just a little introduction to this session before inviting up our guest discussants.

And so the goals of this afternoon's discussion will be to hear a prospective from representatives of county health departments on their experiences addressing community inquiries and concerns about environmental contaminants including metals. We want to identify some of their most effective approaches for engaging with communities about biomonitoring results and actions that should be taken to follow up on those results.

We want to look for ways that biomonitoring California could share the expertise that's come out of Biomonitoring's work, and collaborate with county health departments on these topics.

And so to start off this discussion, I want to introduce three guest discussants. The first is Katie Butler, who is a senior staff analyst at the L.A. County Department of Public Health, where she manages the Community Risk Reduction Program and the Toxics Epidemiology Program. She has led some high profile environmental investigations, including responses to

chemical fires, natural gas and oil releases, and metal emissions from industrial facilities. She holds an MPH from the University of Michigan, and is a board-certified toxicologist.

Sara Cody is the Health Officer and Public Health Department Director for Santa Clara County. As Health Officer she has brought authority to protect and promote the health of Santa Clara's 1.8 million residents.

Sara has initiated efforts to streamline and integrate functions within the Department's infectious disease programs to engage academic partners in helping to address population health, and to articulate the distinct role of local public health in safeguarding all resident's health. She holds an M.D. from the Yale University of School of Medicine.

And Karen Cohn is the Program Manager for the Children's Environmental Health Protection Program at the San Francisco Department of Public Health. Her program proactively identifies and eliminates lead hazards to children. And she's led special projects for the asthma task force, including a pediatric asthma hospitalization research study, a green cleaning in schools project, and a bleach-free disinfection in child care centers project.

Karen created an environmental home assessment that integrates social determinants of health that's meant

to ensure that vulnerable families have healthy housing, and is currently conducting community outreach efforts related to the restoration of the Hunters Point Shipyard. And Karen holds a master's degree in environmental health from the UC Berkeley School of Public Health.

So we have 10 minutes for each guest discussant, and we'll start with Katie butler.

(Thereupon an overhead presentation was presented as follows.)

MS. BUTLER: All right. Thank you so much for the opportunity to speak today to provide the county perspective on addressing community inquiries to environmental contaminants specifically, and approaches to engaging the community.

So I'm going to walk through three case studies of several environmental investigations that we're involved with at the county level focusing on Exide battery plant, chromium 6 response in the City of Paramount, and then also Aliso Canyon I'll touch on briefly.

So in the wake of these disasters, we have had to think about how to build capacity to be able to conduct environmental investigations. And I think the timing for this discussion is very good, in light of the recent capacity building efforts in L.A. County.

Let's see.

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MS. BUTLER: There we go.

(Laughter.)

MS. BUTLER: So Exide battery plant in East Los Angeles operated for decades without permits. And it was closed in 2015, and it left behind contamination, mainly lead is the contaminant of concern, but also three carcinogens that are discussed less frequently, but of equal concern, arsenic, benzene and 1,3-butadiene.

And in the initial -- in the preliminary investigation area, the 1.7 mile radius, we're looking at just over 20,000 homes impacted. And our priority as a public health department, of course, is to eliminate the exposure. So first and foremost, we want the cleanup of the homes as the number one, you know, measure that can be taken. And that process has been taking a long time, so we've kind of shifted gears to focusing on expanding our blood lead outreach -- the blood lead testing outreach and health education, because that's something, as a health department, that we can utilize our team of public health nurses, and our health educators, and really work with the community -- this -- the community-based organizations as well to partner with the churches, and the schools to encourage residents to get the blood lead testing.

So just in the past couple of years, we've been successful to test over 4,000 people in this area. And that's been done by a variety of efforts.

First, we were pushing information out to medical providers, and then we were hosting outreach events. And now we've had very good success in actually a mobile van approach, where we get our chairs, and canopies, and tables, and we set up at areas like a basketball court, for example, and we notify the residents in that area prior to going out with fliers. And that's -- that's been a good strategy for us to get people to come to the blood lead outreach events.

And that's probably the number one effort in the county right now that's most closely related to biomonitoring work.

And, you know, it would not be possible without the support of the WIC centers that distribute our resources, and all of the other community-based organizations that have really teamed up with us.

We also did another outreach campaign, where we had 1,500 public health workers go out into the community to distribute educational materials. So we -- we feel like that has made a lot of -- you know, a lot of strides in getting people to get the testing, in the absence of being able to clean up their yards, so -- you know, being

able to do what we can as a health department.

And looking forward to 2019, I think we're going to continue to ramp up going to more WIC centers, and going to YMCAs, and, you know, giving people information so that they can take more control over their own situations, whatever it may be, to be aware of the potential lead exposure.

And so, you know, just the sheer size and the area of contamination here has presented significant challenges for all of the agencies working on this project.

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MS. BUTLER: The second case is a case of hexavalent chromium emissions from metal facilities in the City of Paramount. And this was brought to our attention two years ago actually in the form of a proposition 65 advisory letter from our local air agency that notified us a metal facility was emitting hexavalent chromium at levels 400 times higher than any other area in L.A. County.

So that puts the estimated cancer risk on the order of, you know, between 1 in 100 and 1 in 1,000. So we're dealing with very high levels of hexavalent chromium. And originally started off as two facilities that were identified. And then once all of the agencies

came together, you know, air agency, fire agency, our health agency, we -- and the local city, we identified over 80 facilities that could be potentially emitting any kind of metal, possibly including hexavalent chromium just in this city alone.

And it's a very mixed industrial/residential use landscape here. So you have metal facilities located across the street from homes, in some cases, and, you know, 500 to 1,000 feet from schools.

So all of the agencies immediately kind of came together to figure out how can we strengthen the, you know, regulatory requirements for hexavalent chromium emissions, because there really are no air standards for hexavalent chromium, and the local air rules were lacking.

So after several abatement orders from the air agency, we issued our own public health directives to seven of the facilities. The facility emissions they have reduced substantially over the last two years. They're still not where we would like them to be, but we've gotten a lot of questions from the community about, you know, what have I been exposed to, can I test for the hexavalent chromium in my body? You know, we're not aware of any kind of hexavalent chromium test that would be useful to people, so we're not able to recommend any kind of biomonitoring in this case.

But the point is that those questions do come up frequently. And, you know, we are normally focused on the environmental data. What do the environmental data tell us about potential exposures. And we usually lead our actions based on that environmental data.

In this case, you know, the air agency was monitoring very heavily for all of the contaminants, mainly hexavalent chromium, in air, but it left a lot of data gaps with respect to indoor air and soil. And so that's where our health department was able to do some sampling relatively quickly to rule those media out as concerns.

And so it ended up that hexavalent chromium in outdoor air remains the main concern. The levels in soil were low. And then the levels in indoor air, we actually didn't find any above reportable quantities. So it really left -- it was good, because then we were able to guide our efforts. Okay. We're going to focus on the outdoor air. And we can now answer people's questions when they ask us about growing produce or indoor school air for example.

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MS. BUTLER: Lastly, Aliso Canyon natural gas disaster. Largest natural gas release in U.S. history. It left thousands of people and two schools relocated. In

late 2015 is when the well SS25 began releasing natural gas, and what we've come to learn now, contained crude oil as well. For four months the well was releasing the uncontrolled gas.

And the point that I want to make with regards to Aliso Canyon are the communication challenges regarding exposures and what people may still have in their body. We still get questions from the public today about what have I been exposed to, what is still in my body, how do I detox my body? These are common questions that we get.

And we, you know, have consulted our colleagues in the academic institutions to see is there any biomonitoring testing that we should be doing? And the consensus is that, you know, there's no biomonitoring at this point in time that would be helpful, especially most of the chemicals were transient in nature. They're volatile. So, you know, benzene testing, for example, at this point in time, you know, wouldn't tell us anything useful.

But at the same time, we have medical -- a medical professional in the community who's doing his own testing for benzene and blood. And so it's been very challenging as far as getting the scientific information out to the public. And I think that challenge will continue as we launch a health study. We are expecting

$25 million in funding, as soon as the court approves the settlement. That was agreed upon. And that's expected to occur any time in the next couple months.

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MS. BUTLER: Here's the -- a map of the Aliso Canyon symptoms that were reported during the incident itself. And this is showing a five-mile radius. So each mile increment on the map -- and it shows how the majority of complaints, or symptom reports, did occur in the Porter Ranch area, but other areas were also impacted surrounding Chatsworth, Granada Hills.

And it was very irregular as to how the symptoms were reported. And that was due largely because of the geographic nature. It's very hilly in this area. And during the -- during the disaster itself, you know, a lot of the symptoms were co-located with odor reports, with mercaptan, the natural gas odorant being the known cause of many of the symptoms.

But we were left with some unanswered questions. We did have a lot of nose bleeds being reported. And to this day, nose bleeds are still reported. And from our research of mercaptan, nose bleeds wasn't something that we could verify as being caused by the Mercaptans.

And so, you know, that's another reason why we felt this long-term health study was so important to be

able to help answer some of those -- those health questions people have.

And this -- this symptom map here, just again kind of illustrates the large geographic area, many different communities that our public health department had to, you know, communicate with and will have to involve as the study -- as the study is launched.

And our role for this study, we really intend to just facilitate a community-led effort, so that they can really take ownership over the study itself.

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MS. BUTLER: So after going through, you know, these disasters and other incidents that we've encountered the last few years, we've been very fortunate to get support from our local board of supervisors -- our county board of supervisors to continue to build capacity in the area of environmental monitoring and surveillance. And we really have a focus on empowering the communities that are most vulnerable and really trying to focus our efforts in certain areas that experience cumulative exposures with multiple burdens. With a county as large as L.A., 11 million people, we've used that strategy to kind of focus our preventative monitoring and surveillance efforts.

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MS. BUTLER: So thank you again.

(Applause.)

CHAIRPERSON SCHWARZMAN: Thank you very much Katie.

We're going to have all three discussants present and then we'll have a chance for questions, and then we'll have a little break, and then we'll have a discussion, so you know what's coming.

So Sara Cody.

DR. CODY: Good afternoon. I don't have slides for you. Again, I'm Sara Code. I'm from Santa Clara County.

I am probably the only person in the room that does not have environmental health expertise or background. And so I think that's why I'm here to give you really the layperson's perspective on what this looks like.

So I'm a general internist by training, and I have a very broad role for the County of Santa Clara, which is the Health Officer. And what I wanted to emphasize is a little bit about how local health departments are structured, and that we're all structured very differently. And I think it's helpful to understand that and think about that when you think about this very intense work that's done in biomonitoring and then think about how can that be received and used by the local

health departments.

So Santa Clara County, as you may know, it's -- we're the fourth largest county. We have two million people. And when you look at one -- there's an adage that says when you've seen one local health department, you've seen one local health department.

(Laughter.)

DR. CODY: And we're structured quite differently than my colleagues from L.A. and San Francisco. And I was getting a little jealous over lunch. We -- our public health department sits in a completely different part of the county organization from the environmental health department. We work very closely together every day, but we report up -- our reporting structure doesn't really intersect till we get to the county executive.

And just to give you a little bit of the sense of the kind of expertise that lives in environmental health, and in public health. In public health, we're very rich in infectious diseases. And our health officer team of six, two of the six are ID physicians in fact. I'm a general internist. We don't have anyone with any occupational or environmental health.

We have lots, and lots, and lots of nurses. They work in maternal child and family health. They're excellent at connecting to community resources, providing

support in breast feeding, and in nutrition. And no background or grounding in environmental health.

In chronic diseases, lots of funding and focus on tobacco and obesity. And a little sliver of work on climate change. But there's not an environmental justice group in chronic disease.

We have in our environmental health department, lots of work on food safety, regulation. There's a little bit of work in hazardous materials, but it's really about site mitigation, quite precise and quite specific. There's a little bit of work funded by the Childhood Lead Poisoning Prevention Program, an environmental health specialist that does it, but again, no broad area.

So essentially in our county, we do not locally have the resources or expertise to understand and evaluate the human health effect of environmental contaminants, be they from soil, water, or air.

So we are completely dependent on understanding and knowing where to go for technical expertise and resources, and really understanding State, federal, local jurisdictions, and it's enormously complicated. So I just wanted to give -- to give that background, because that's what it looks like in Santa Clara County.

We don't have environmental health concerns that come to us every day. They really kind of come in fits

and starts. So it might be a couple times a year or there might be quite a bit of time that goes by with nothing. But I wanted to give a couple examples of the types of issues that come -- that do come to our attention and be honest about how we struggle with them and what we do.

So I remember -- I've been at the county for 20 years, and I remember very distinctly the very first time it was Thanksgiving day in the late 90s, and I was the health officer on call. And I got a call, they had closed Highway 17, because of a hazardous materials spill. And the battalion chief on scene wanted the health officer to come and declare it safe to open.

And I'm really good a diarrhea outbreaks --

(Laughter.)

DR. CODY: -- but this was not something I thought, well, I could bring a match and light it and see what happened.

(Laughter.)

DR. CODY: You know, I really didn't know. So just I thought I would open with that.

Several years later, we had widespread contamination of drinking water in south county with perchlorate. I was the health officer at the time, and I really had -- I mean, I remember sitting in a room and speed reading papers and getting on the phone to see who

could help us, because we were going to be the people that were going to be up front at the community meeting answering questions, and we felt quite uncomfortable.

Just -- there are many other examples. But the one that I wanted to tell you the most about was about two years ago, we had a report of -- that came in through pesticide reporting of a man who came into an emergency department with some symptoms of organophosphate poisoning. This report came to our communicable disease group, because that's the group that we have to handle pesticide reports. And it also came to the county agricultural commission.

But it was a very long time before all of the paths intersected to really understand what was going on, because the county ag commissioner was focused on the fact that this was illegal and not approved for use in the United States, and what did that mean. And he was consulting with his counterparts at the State and the Department of Pesticide Regulation.

On our side, there were a couple misses, including having been reported to the wrong county first, and then getting back an electronic data system that wasn't working very well back to us.

So a long time passed before the right people were on a conference call, at which time we recognized

that the gentleman that had been -- that presented with poisoning had actually lived in an apartment complex where an exchange for a reduction in rent, he was acting as a -- sort of like a grounds manager. And because they had had a lot of issues with rodents and bed bugs, the owner had asked him to use this special stuff that she got from a relative in Nigeria to take care of the bed bugs and roaches.

And the label stated that it was just for outdoor use. I don't know what the regulatory situation in Nigeria is, but this is -- it was dichlorvos. And he had been using this indoors in large quantities applying it to a upholstery, baseboards, bedding, near kitchen areas.

And during the course of the conference call, I asked, well, who lives in these buildings? And it eventually came out that it was -- that our public guardian can serve -- county can serve patients, people who were living in these buildings as well as our behavioral health department had people under their care with severe mental illness, who were also living in these buildings.

And that -- and the -- the land -- the woman who owned the apartment complex has had six different buildings. And this gentlemen had been at all different buildings. So we, as a county, then we had public

guardian, environmental health, public health, behavioral health, county counsel, et cetera, et cetera, et cetera, but nowhere in our group did we have expertise to understand what the health risks were.

And I'm the health officer, so they were asking me, Dr. Cody, what do we do? What does it mean? Who's been exposed? What's an exposure? Should we be rehousing these people, et cetera, et cetera?

And I just want to make the point as far as the complexity of understanding where to go for resources, it took me quite a long time to understand who I could access for expertise, because we have no toxicologists. And ultimately, we were getting slightly different opinions once we did involve experts.

So my -- there's -- my -- what I really want to communicate is that when you get down to the -- where the rubber hits the road, we have a lot of work to do in understanding how to optimally organize. And when we have environmental concerns that aren't -- we don't sort of have a continuous stream of need, it's more in fits and starts, I think that the resources that we most need is someone who's a really fantastic project manager, as well as a map to wear the resources are.

Sometimes the -- the inquiry comes in in different ways. And interestingly, it frequently comes

into the folks that answer the phone at the front desk -- so the phone numbers that are listed on the public health department website.

So I think -- I guess in closing, other than poaching from other counties, which I've already got some great ideas for how to poach expertise from other counties and import them to Santa Clara County, I think that just thinking about -- just recognize that the expertise and what you all think about every day probably doesn't exist in most county health departments.

And so part of the challenge is knowing that even though the public is going to those county health departments, those county health departments probably aren't going to be able to respond. And so unless it's extremely clear and extremely easy where to go when for what, that a lot of opportunities could be -- could be missed.

And now I'm going to turn it over to Karen, who I'm going to poach.

(Laughter.)

(Applause.)

CHAIRPERSON SCHWARZMAN: Thank you.

Thank you. Karen Cohn from San Francisco Department of Health.

(Thereupon an overhead presentation was

Presented as follows.)

MS. COHN: Thank you very much for having us speak today. I'm learning a lot. Getting very excited about all the different ways that all these things interact with each other.

So I'm an industrial hygienist by training. And I've been 25 years in my position. What began as a childhood lead prevention program and has sort of grown into a little more comprehensive children's environmental health promotion, but we do primarily -- let's see if I'm going to do that right.

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MS. COHN: Okay. There's our bread and butter right here. The orange color of the map is I where lead paint has been used.

(Laughter.)

MS. COHN: Pretty good, huh?

So we have no shortage of lead, but we do have a shortage of children. We are the county in the country with the least children, percentage-wise.

And so we do a very aggressive job finding that. We respond to any level of detected lead. We also have proactive authority in our health code that if there is a lead hazard and a child is under six, we can cite that as a violation. There does not have to be a blood test. We

can require certified people to fix it and so on.

And we're part of the ten jurisdiction lead litigation that's about to award millions of dollars all over the state to be spent in a four-year period, which means the paint companies want it back at the end of the four years.

But anyhow, the green dots here are blood lead levels as a heatmap. And so, you know, again, it's where they're not rates, but they are where a lot of children live in those districts, and also the dis- -- I mean, all the districts are old enough. But on the east side of the city is a little more wood, on the west side of the city is a little more stucco.

So it's generally wood that was painted with lead point. And that's our big biomonitoring project there.

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MS. COHN: Also, on the left as far as community concerns, gardening has been a big concern. There's been a lot of civic activity and legislation to promote gardening in San Francisco as a food source, and as a micro-business, and to let people get through all the Permitting and all that.

And our health department started this garden on the left as a place for homeless and housed people to work together as a community. And they took a few little soil

samples, and said, okay, it's not contaminated.

And then a friend from one of these programs in the State came by, and said did you see that building on -- and the peeling paint was visible from Good Earth.

(Laughter.)

MS. COHN: It was like hanging off the building, ready to fall into the brand new garden. And so we had to do a little more emergency stuff with our HUD grant at the time. And before all this was planted, it got fixed. And -- but, you know, it caused a lot of waves. People were very unhappy, because we're like interfering with our own department's program. And they had already tested the soil. So it was really -- it gave me the idea of what's the difference between thinking about risk and thinking about contamination, and that our health partners or our public doesn't really know the difference.

And so we said the risk is right there. It's about to be washed down in the next rain. The contamination was which dots of earth you happen to pick up, and whether they were the right dots of earth.

So I think that sort of helped inform us that we, from that point, created a guidance for setting up your gardening, always about imported soil, where you get the tested imported soil. We've just had our first case that had to do with somebody with chickens in their backyard

where the soil was contaminated.

So about -- I mean, again, most children don't have access to bear soil. But when we test it, at least half of it is above the State's childhood lead poisoning standard 400 parts per million. And if we use the OEHHA standard of 80, which we're trying to put into our code, over 86 percent would be failing. So it's there.

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MS. COHN: We've had several cases having to do with consumer products such as meds and herbal medicines, and ayurvedic. And we wrote a newsletter that we shared with other counties. It's a real big problem for the lead program in Alameda and Fremont in particular.

We've had an adult case where somebody had advanced kidney disease and was also having poisoning from their ayurvedics and somebody published a paper at Stanford related to that.

And then when I started looking at it to write the newsletter, it's the most widely used medicine all over Asia. It's a huge concern of the World Health Organization, how to figure out whether -- you know, some of the products have metal in them on purpose, and some are just contaminated. So they really haven't figured it out.

India did start some testing of products, but the

levels they were looking for were too high for us. So that's sort of an ongoing concern for education.

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MS. COHN: Let's see. The other thing in researching to present to you today is I'm thinking where is the community need? And I got so many different ideas about reproductive health through that search that I just felt, at the end of it, we have no cohesive strategy to counsel people about toxicity and reproductive health.

There was this study from 2010, where there's an association with lead in cadmium, reproductive hormones in pre-puberty for girls, where it's slowing things down. And there were never any follow-up studies. There was not -- it's like it's not part of our counseling to patients or anything.

This one in the middle Little Things Matter is Bruce Lanphear. He's a leader in lead research. He's now in, I think, Vancouver. And he said in this little video that England had like a tiny bit of lead in the female population. And when they were able to reduce that, the pre-term births went down. Like, you know, an association, but like that on a population basis, these are significant issues for reproductive health.

And I know we have the UC pre-program that has this pregnancy exposure center that you probably have

worked with with your biomonitoring studies. But -- so again, if little girls get lead poisoning and it's enough to be stored in their bones, and it's a 20-year half-life, and now they're having children as it's going to get migrating out of their bones. That's all very well studied in the literature, but we have no cohesive clinical guidance, no doctor ever asked you had you been lead poisoned as a child now that you're here as my prenatal patient? I mean, none of that has ever been connected.

So I do think it's an area of research for you all to consider what is the reproductive health cycle? I know there's been youth projects about cosmetics and about reducing metal in cosmetics. But this really touches on very many stages of life, as the metals come out of the body. It's also a problem for I think osteoporosis and alzheimer's now too to see lead coming out of the body later in life.

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MS. COHN: So my particular experience now is I'm doing a lot of outreach related to Hunters Point Shipyard because of the fraud that happened from the Navy's contractor in measuring radiation. It's a highly educated community that's experienced a lot of environmental justice issues. Very, very heightened sensitivity about

issue that are out of your own control.

There's been serpentine rock asbestos issues there. There's this radiation monitoring. This little deck marker was just found in the soil a foot down, you know, not an exposure concern. But just -- there's enough that goes wrong at this site that people are really completely untrusting of any type of government source of information. And they've hired their own experts who are not really credentialed to be experts.

So I feel that if biomonitoring was to fit -- this community has asked for biomonitoring. There's a widespread belief that the health disparities of Bayview Hunters-Hunters Point are related to environmental exposures, and in particular to the shipyard as an exposure source, even if people don't have an exposure pathway from the shipyard to themselves, the -- when I -- when this deck marker was found, a nurse even asked me do you think this could be a reason for the excess breast cancer in our community?

So I'm just saying that the whole public understanding of exposure and just the journalists' understanding of these scientific issues that they're covering is very poor also. And it's all been very sensationalized. So I just -- if biomonitoring -- if you had enough resource, and it was coming to us, we would be

asking you to do studies here.

I also feel there's a big gap in what people's understanding and resource to go to for environmental causes and associations of cancers -- of various cancers. It's not like you just go to the encyclopedia and -- you know, like summer are very obvious. Like benzene causes X. But breast cancer, what would I be biomonitoring for? What would be the community's belief of what I should be biomonitoring for?

So anyway, that is an ongoing issue. I've talked to about 700 people related to the shipyard.

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MS. COHN: Also been involved with air quality stuff. And that's another place where people know that they've been exposed, particularly if they live in the blue zone. This is a combination of these purple dots, which are stationary permitted sources by the air district, traffic modeling, area sources like the port and the train station. And it's both cancer-causing, like toxic air contaminants, as well as particulate matter.

Those are our risk areas. It relates to a law we have that's for building new residential or sensitive use buildings. And that blue zone requires a specialized filtered air system. You have to prove MERV 13 filtration or the equivalent. So it turns out this whole south of

Market area -- I'll show you the pictures of what used to be built.

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MS. COHN: So my friend lived right -- a couple blocks on a leafy street near the train station. And this was his little allergen fabric he put on his air intake. He had to change it every month, because of the soot coming from construction, and the trains. And that whole community is again very up in arms, very well educated, very -- a lot of advocacy. And the train -- Caltrain changed management to a company out of Missouri and Texas, and they stopped using the electrification that had been put in for the idling. Like something broken, they didn't fix it.

And then all these people were being woken up all night. They had all this soot. So these are the types of issues that come in. And this other one is -- on the bottom left is just built across from the freeway and the Muni yard. And the only thing separating the air from his unit is a metal grate, so that rocks don't fly in. There's nothing. And he has somebody clean soot off his shelves every week. You know, he has a house cleaner.

--o0o--

MS. COHN: The last is wildfires. Because we have these large construction projects on the Hunters

Point area, there's Candlestick, and the shipyard itself, and then the Alice Griffith Project that got rebuilt, we have perimeter air monitoring for both asbestos and for PM10.

And so we could really see the difference in the week of the fires last year. And these graphs were the evidence of that, as far as like what we were all experiencing, what was coming into the air intakes of our office buildings. I had to run air filters inside my office for the staff to be present.

It is really hard. And I know that was even more so if you were in Santa Rosa. But it was a big effect here. So I think that's something to prepare for maybe from a biomonitoring point of view also.

--o0o--

MS. COHN: I think that's all. As far as other things that came up for me while people were talking, I felt there should be sort of a career development aspect of working with partner -- community partners, because the findings are most listened to when they come from a peer. And I've been in a position of being on a biomonitoring study with mercury with some of the partners here.

And by the time I got to that woman, the baby had already been born, the study started when she was pregnant. The baby had already been breast fed for a

while. I told her all about face creams through a language interpreter. No click, nothing. It did turn out to be a face cream that was compounded in Mexico, and brought by her mother and given to her as a gift.

So I just think the messenger counts a lot. I mean, the person wasn't trying to be evasive to me, but I just think whatever I -- illustration I showed or whatever I talked about is irrelevant, unless maybe there's a companion message coming from within the community. And also, it's a way of interesting like young adults into going into this career to sort of train them to share the findings, or to create the incentives for these people whose phones change a lot to call in on a certain date. But to be that sort of community ambassador, I think there's a role to play for that.

CHAIRPERSON SCHWARZMAN: You think we might do -- sorry, if I could interrupt you for just a second. We're going to have a whole discussion --

MS. COHN: Oh, I'm sorry.

CHAIRPERSON SCHWARZMAN: -- and these are wonderful thoughts.

MS. COHN: Okay.

CHAIRPERSON SCHWARZMAN: Maybe we'll -- please keep them and it --

MS. COHN: Oh, from this thing, sure.

CHAIRPERSON SCHWARZMAN: -- will trigger lots of discussion.

We have ten minutes now for questions for each of the three discussants --

MS. COHN: Go ahead.

CHAIRPERSON SCHWARZMAN: -- so don't go too FAR away. So if all three discussants -- presenters could come closer, we have 10 minutes for questions about the presentations, and then we'll break, and then we'll have a full discussion. That will be great.

So while you're coming down, thank you all for your very thought-provoking presentations. And I'll start with a question just as the Panel is getting organized for Sara. I'm wondering what you're relationship is with CDPH? So this is just my ignorance. I don't know what the county health department -- how the county health departments relate to CDPH and what that pipeline is like for expertise and access to information.

DR. CODY: So thank you -- thank you for the question. We have a fantastic relationship with CDPH, and we're really good at accessing resources for content areas that we know and work in. It gets harder when there's a content area where we don't work in very often, because we don't know the network.

And so just as an example, in the case of the

pesticide -- the illegal pesticide use, when I was having a hard time figuring out where to go and who knew what, I contacted someone with whom I had a relationship, because he used to work in immunizations, and then he was my guide, and then I was set.

But I needed a guide. I needed a navigator. So great relationships with CDPH, but a little bit of lack on our end of just readiness to know how to access resources and content areas where we don't work frequently.

CHAIRPERSON SCHWARZMAN: Thank you.

Other questions from the Panel?

Yeah, Tom.

PANEL MEMBER McKONE: I wanted to -- maybe this belongs more in the discussion part, but I didn't want to bring up a question related to air cleaning. And it's interesting, because it's probably not biomonitoring, and it comes up both -- I mean, in the concern about San Francisco and air quality. But it also came up in a Aliso Canyon.

And, you know, one of the things I was fascinated -- I was involved in looking at some of the issues related to Porter Ranch residents. And I was quite interested to see that the gas company was required to provide air cleaning units. And then I looked further, and they actually -- the air cleaning units were

recommended by the Air Resources Board and they actually did a good job. So I have an air cleaning background and worked on indoor air quality.

So they really recommended the right kind. But what concerned me was it didn't look like there was any follow up to make sure people knew how to use these units. And so, you know, one of the problems is there's some -- I don't want to mention product names, because we're on -- we're live, but there are a couple of products out there that really work. And they really work because, A, they move a lot of air and you've got to move a lot of air, and you've got to have the right kind of filter.

Or in the case of Aliso Canyon, because of the compounds, you probably need a filter with activated carbon and probably permanganate or some other material, because there's two different kinds.

So it was very good, but what I would -- you know, and this is like I say kind of a biomonitoring or exposure monitoring is these things have to be tracked, right? You have to make sure people know how to use them, and then actually take samples to see if it's mitigating the way it should.

And the same issue is true. There's been some really good work now about how to protect residences from wildfire smoke. And like MERV 13, which is now the state

recommended -- the building code is going to insist that requiring furnaces to all have a MERV 13 filter. But again, if you don't run it, and if you don't seal up your windows, it doesn't work right.

So just a little insight about is there efforts to sort of not only provide this information, but resources so people know how to use these mitigations, and then maybe later on we can do the exposure biomonitoring, to see if it really is making a difference. But, you know, it's a different question.

MS. COHN: I have direct experience with the research project for indoor air quality filtration. We had a settlement from a power plant that was closed, Mirant power plant, and we worked with Lawrence Berkeley Lab as the evaluator.

PANEL MEMBER McKONE: That's my group.

MS. COHN: Indoor air quality group, so you know Brett.

PANEL MEMBER McKONE: Brett used to work for me, but I'm retired.

(Laughter.)

MS. COHN: Right. There you go. And different agencies, including the air district. And we did a retrofit of four private homes in Bayview Hunters Point that had furnaces, and we retrofitted them with a MERV 13

new furnace and all that.

And operator error in broad terms is the biggest barrier to the effectiveness of that. Thermostats are very difficult for people now. They're programmable. People don't understand that they like on and off. We had mostly elderly residents. We had people who burn candles and incense. You know, we had a lot of different things. We also replaced bathroom and kitchen fans and things like that.

But I would just that what we learned from the -- trying to put in better furnaces for people who lived near busy roadways is that the -- they were low-income. They were not used to using their heat. They could not afford their heat. And to run -- to even give them a thermostat where they could run the fan by itself without the heat was still a barrier, because they could not operate the thermostats. So that was definitely a barrier.

Then we switched to doing four condos above the Whole Foods in Potrero Hill, where they have lots of deliveries, and lot truck idling, and stuff like that. Half the people who volunteered were research scientists of indoor air quality.

(Laughter.)

MS. COHN: They already owned air filers and we measured the effectiveness of adding portable air filters

to their units, and that was also effective.

They both were effective at the whole measurement stuff that Lawrence Berkeley Lab was doing, and it's written up and published on our asthma task force website. There was a self-published study. So that's sfgov.org/asthma.

Yeah. So, yeah, it's -- they're both good strategies, but they do require operator things. And then even with the -- I've given away quite a few portable air filters to asthma and COPD patients. And I don't know if they can afford the replacement filters, either for the charcoal, which is four times a year, or for the -- the HEPA part of it, when it comes around. We always give them one year of replacement. But are they going to open it? Are they going to put it in the right way. It's very hard to know. Yeah, it's a difficult question.

CHAIRPERSON SCHWARZMAN: We probably have time for one more question.

Oh, you want to add.

MS. BUTLER: Just really quickly with respect to the Aliso Canyon disaster and the use of air filtration. We did survey people in the CASPER. The rapid survey we did with partners from Environmental Investigations Branch here, and we did survey people asking them about their frequency of use of the air filters, whether it was the

portable, or whether -- the gas company was also offering in-unit filters. So different kinds of filters were out there.

And we tried to tease apart, you know, what kind of filters were being used, and then if that could predict people's reporting of symptoms. And we did not find that it -- that it could predict the reporting of symptoms. But we did try to look at that, because that is an important follow-up evaluation type question. Especially for something in the case of Aliso, where when we worked with the Air Resources Board, you know, we did identify the best type of filter we thought would be advantageous for people, but we still -- we could not say for sure whether it would eliminate the odors just because of everyone's own individual different use patterns of their homes keeping doors open and such, so...

CHAIRPERSON SCHWARZMAN: Any other questions, Panel or audience?

Well, we'll have a chance for a full discussion after a break. So we will break for 15 minutes now, and start again at 3:35. And I just want to mention to the panelists that there's going to be a table rearrangement during the break, so consolidate your belongings, unplug computers, close computers, put your bag on your chair or something so that staff can easily move the tables around.

MS. HOOVER: And I'll just say that Nerissa has generously donated some snacks for people and those are going to be out in the back table behind the auditorium.

CHAIRPERSON SCHWARZMAN: Okay. So we'll now break until 3:35.

(Off record: 3:19 p.m.)

(Thereupon a recess was taken.)

(On record: 3:35 p.m.)

CHAIRPERSON SCHWARZMAN: Okay. So we are going to open the afternoon session. I've had to figured out a new mic, so that's working, right?

Just when I was comfortable with it.

Okay. So this is our chance for discussion with our discussants -- with our guest discussants, and the audience, and the Panel. Is there a slide Sara that has those discussion points.

MS. HOOVER: No, we're not showing slides.

CHAIRPERSON SCHWARZMAN: No. Okay. So maybe I could just reiterate the discussion points. Part of the reason -- there's lots of reasons to hear the county health department perspectives, but to articulate some of them. You know, we got the chance to hear about their experience working directly with communities and addressing community inquiries and questions about environmental contaminants including metals.

And so our questions now are to think about how to productively engage with communities about biomonitoring results. And, in particular, what communities always ask, right, is what to do about the findings? And so those are always hard questions to answer. And I think Biomonitoring California has enough experience now with results return. And we heard this morning from Nerissa about some of how it's going with ACE. I think it was Nerissa who talked about that results return. Anyway, that there may be some expertise that's helpful to county health departments there, and also for ways that Biomonitoring California can collaborate with county health departments and perhaps get help about the community resources that you all know and depend on for reaching communities members. I was interested to hear about WIC -- reliance on WIC for a way to distribute information. It's a great idea.

So anyway, the information I'm expecting will go both ways. And we can think about it through the lens of metals. And it's something that each of you has touched on -- each of our discussants has touched on, and it's the main topic for today's Panel meeting. But, of course, that's not to exclude other environmental contaminants or discussion of that.

And I think air pollution is a common theme also,

that's common between biomonitoring studies and often the concerns that communities raise -- and community members raise. And particularly looking at the map of the affected areas in San Francisco, right, that tracks the freeways and point source.

So maybe that's enough prompting of the discussion. And I'll open it up to Panel Members. If no one has a burning thing to start with actually, I might return to your list of thoughts, because you had a nice list of thoughts that I unfortunately interrupted to stick with questions. But maybe that's a good place to start.

MS. COHN: There we go. Fine. Okay. So we started working with WIC in order to do proactive lead investigations. Once, like 2003, we know that low levels of lead are just as dangerous, we needed to have an outreach method. So that program is not allowed to give away their addresses, but they would -- we would go -- we go to their office and they print out mailing labels, and we bring our envelopes, and we have a mailing party.

And so we've done that a number of times. We can do it by zip code, by language and so on. And it allowed us to go into a few hundred homes at once. And it allowed us to explore a whole new path, which is housing insecurity. But I think that it's -- we have the luxury of being a combined city and county. But even if I was a

county health officer, you could still have that partnership with various cities and their WIC programs.

So we broadened it from there, all maternal child health programs have the ability to refer into us for home visiting. So the public health nurses who are in several programs, they see newborns. They, you know, do lactation consults. They also are in the research based work of family nurse partnership. They all refer into us also. And those are probably the worst homes, like the ones where -- like the parent is very motivated to make change. They're willing to take the risk in our rental market to make waves with their landlord, just because they really care.

And so that was really my last point was that in the ACE and the BEST when you saw those results, and some people didn't necessarily want to change their behavior or find out what this mercury was about, on whatever, perhaps extending the testing to their -- the rest of their family, to their children would be more of a motivator, because people are willing to change things and take risks to protect their children. So we just see a lot more motivation in that regard.

But I'd say that anything related to housing sources is very vulnerable right now. Code enforcement is a very vulnerable tool, because all throughout our state

people have too insecure a housing situation to take the risk of using code enforcement. There's even a drop in WIC enrollments because of all the immigration policy issues.

So let me see what else I can pull in. I thought the -- I had youth interns in this last summer that were like community college level students. And I think they easily could have been trained to help communicate some of these results that are from your studies. And it's -- what I've really been told by these community agencies that do these internship programs is until they meet people in these careers, they don't know these careers exist. They don't know which courses to study in school. They just -- you know, they don't have a path forward. There's no community experience to guide them.

So my job was to introduce them to environmental health careers, and to public health in general. And the thing that they got most excited about was the cannabis awareness campaign that was being planned for youth. And they helped inform the messaging quite a bit. But I also think that's an area for biomonitoring. Our health department published a health impact assessment about cannabis legalization. And there's a concern about the normalization and the youth and child exposure.

So I don't know if that is within the domain of

biomonitoring, but there will be a lot of money and a lot of cannabis industry people that want to give money to make their industry feel like a good partner.

CHAIRPERSON SCHWARZMAN: I know that pesticide contamination is one --

MS. COHN: Yeah, pesticide is simply part of their regulatory scheme, but --

CHAIRPERSON SCHWARZMAN: Which might be overlap. I'm just mentioning that, because it might be overlap with biomonitoring. Whereas, the cannabis itself isn't.

MS. COHN: Yeah, that's very regulated.

CHAIRPERSON SCHWARZMAN: I'm interested to hear about -- well, one thing that your comment just said about the youth interns reminded me of conversations we've had with this Panel about the HERMOSA Study that involved -- it was a UC run study, and Biomonitoring California contributed lab capacity about -- it was an intervention study looking at changes in -- for three days a change in young Latina's or Latina adolescent women living in the Salinas Valley in their personal care products. And this youth research group chose the products, and did a lot of the information dissemination, and recruited participants.

And they were, as I gather, from having heard about the study, really key to the success of the project. And then it has this ancillary benefit of educating them

and showing them a career path that they've gotten interested in.

MS. COHN: I think I read about that too. That was very -- anyway, that was great.

The other one is like to think of your projects as working backwards from known health disparities. So there's -- you know, all of our departments are really good at publishing data on health disparities of health outcomes in ERs, and hospitalizations, and premature mortality and so on, but we're not as good about like -- just like working backward from that, and helping communities be engaged in the solution.

So I think something like pre-term birth, where there's a huge disparity by race, and there's so many -- there's so much attention now to the social determinants of health that go into it, but perhaps not as much to the environmental determinants. And that would be a way to contribute to that. And it's a very well-funded area right now. At least in San Francisco, the UC project is Benioff and Gates funded. And it's in three countries in Africa and three cities in California.

So I think they probably -- they also have quite a few research grant opportunities that they put out. I don't know that any of them have been environmentally focused, but it might be a relationship to cultivate.

CHAIRPERSON SCHWARZMAN: I don't want to just jump -- I have something else I could say, but I don't want to just dominate the...

Go ahead, Tom.

PANEL MEMBER McKONE: How about that. Okay.

Now, that I've met that challenge. So one of the questions that sort of is overarching I think in a lot of this and that we often --

MS. HOOVER: Get closer.

PANEL MEMBER McKONE: Closer. Okay -- haven't come to terms with is how to -- I've noticed in public meetings that I've been engaged in, which aren't that many, but still ones where we're actually out there, people get very confused about the difference between chemicals and harmful chemicals. And I'm not sure we're still doing a good enough job of making clear that you're probably going to find a lot of chemicals in your blood, but that's not the issue. I mean, I've heard people, you know, make the comment, oh, there's all these chemicals in my blood.

Well, of course, there are. I mean even exogenous chemicals, but it's really focusing on what's the difference between finding some chemical and finding a level of concern. And, you know, again, maybe in the medical world, it's pretty easy to do this, because blood

pressure -- everybody has got blood pressure, but in some people it's too high, right? We have standards about what there are, so you don't get nervous about something just because you measure it. You get nervous about something because you measure it in some range.

But I don't -- I often see that fail to come across in some of the presentations, that there's a big difference between finding a chemical, even a chemical of concern, and finding a chemical of concern at a level of concern. Maybe I'm just missing it, but I think that happens a lot.

MS. BUTLER: That does come up a lot at our community meetings. I think you're right that, you know, there's a lot of even essential nutrients that we could find, right, in our hair, or urine, or blood samples. And I think that identifies a real opportunity for workshops with community. There's now a heightened awareness of environmental contaminants amongst any public. I think there's interest there.

We see it at all of the community meetings we attend that the general public is now -- because of information that's accessible, you know, they're more -- they have good questions and they want to learn more. I think there is a real eagerness to understand some of the science behind it, but we have a lot of -- a lot of work

to do in that area of scientific literacy, absolutely.

Something that I often struggle with is understanding whether or not, from the scientific perspective, when I'm translating something for the public, is do we have a good understanding scientifically of what levels are considered normal. And that, to me, is a fundamental question that we have to be able to answer before we can explain it to the public. Or if there is uncertainty, maybe that's okay. We need to be able to explain that to the public as well.

So that's something I grapple with as a scientist trying to interpret the data for the public is I know that question is going to come up. And I think we had some discussion earlier about NHANES data, and how that is, sure, representative of the United States, but, you know, can -- I can't necessarily point to that data as representative of California, and surely not at Los Angeles County, or the City of Paramount, which is 50,000 people.

So when we're operating in the field on this very micro level, you know, having to extrapolate nationwide data and pointing to that as background, that now is very -- very imper -- not personable, or not close enough, not relatable enough for the person that I'm talking to who is a mother of three that lives across from a metal

processing plant. So there are some challenges there.

CHAIRPERSON SCHWARZMAN: Ulrike.

PANEL MEMBER LUDERER: Yeah. Now, can you hear me?

Yes.

I think you bring up a really good point, which is that, I mean, as we've kind of heard in all of these discussions of the Biomonitoring Program as well, that for a lot -- well, for the metals it's -- are actually kind of an exception where there -- for several metals, there are very clear levels of concern. But for even most of the things that the Biomonitoring Program is currently able to biomonitor, we don't know what the level of concern is, if there is a level of concern even, in some cases.

So, I mean, that -- I think that is a really big -- that's really important, and it's a difficult thing to communicate. But I think it's really important to communicate. And, you know, you had -- you know, you just mentioned some thoughts on it. And I was wondering if the other -- if you two also had thoughts about that how to -- best to do that?

DR. CODY: Yeah. I think my role here is to speak as a layperson. Really. I think what the public wants to know is what is the action that we are recommending that they take. So instead of -- they want

to know, you know, if -- do I have something that's harmful to my health? What am I supposed to do about it? How do I reduce my exposure, or if I've already been exposed and have a level of concern, now what?

Am I -- do I -- who do I need to see? What do I need to do? How do I bring it down? What does it mean? Am I going to die early? Do I need to, you know, plan for my family? It's really basic questions. They want to know the actions that are associated -- what are the recommended actions associated with information they've been given?

MS. COHN: I've been involved in the two biomonitoring studies, one as a partner to follow up on lead and/or mercury. And the second when I was in the control group for the Women Firefighters Study.

And my experience is that we should be sharing the information at the beginning when you participate. You know, this is what the results page is going to look like. These -- you're going to fall into one of these three categories, and these are the things we're going to recommend. And just really -- I found that there's like a really big time lag, because you only have so many lab resources.

By the time I got my flame retardant results, I didn't really remember having been in the study. You

know, it was just sort of it didn't -- it was like, oh, yeah -- and it did give the categories of this is what other people have. This is what the control group has. This is what the study group has, and these are the ways you can avoid it. So that was fine, you know. If I had been a very concerned person, that would have been adequate. Only one out of six had a problem.

And so I thought it was all well designed, but I think you could just do that education right at the front end, that this affects everybody, and you'll all be somewhere on this spectrum. And, you know, it's very likely that nobody here is going to have something that makes them sick. But we want you to know exactly what we're going to give you at the end, and where you'll be able to put yourself in it, like where you are on that spectrum.

I also had the Health Officer, Dr. Aragón, asked me to lead a journal club this past month, that was a recent study about the Flint water crisis and the epidemiology of lead poisoning for kids. And that doctor from Ann Arbor, I think from U. Michigan, said that we've done a disservice to the community by labeling them as poisoned, that we've created a huge stigma based on an epidemiological measurable blip that was equal to the one found in 2010 to 2011, not statistically different.

And then it turns out that every county in California has that same blip in 2010 to 2011. I knew my program did, but we called the state, and we found out every county had it. So there was some sort of methodological problem with lead measurements that year. There is such a thing as a false positive. We had it happen another time with the reagents being wrong or something. I don't know what it was.

But I'm just saying that -- so they -- so I had to present this journal club about are they poisoned or are they not? And the people in my audience were other colleagues of my department, and they were just outraged, how can we even be asking this question?

And so I just think it's important to sort of layout that gradient to people at the beginning, so they understand that it's not like black and white, you know, you're poisoned, you're not poisoned. Clearly, there were kids that had more lead than they should ever have been exposed to. And it's definitely an environmental injustice that all the stress of the community had to go through and is still going through.

So there's clearly crimes that happened, but thinking that your child is doomed for the rest of their life is a different outcome. It was not the -- you know, necessarily, the most responsible way to have handled it,

so -- and then it turned out, you know, Reuters investigated afterwards and found 400 cities in the United States where lead poisoning rates were higher than Flint, Michigan. There were two or three other cities in Michigan that were higher. None of them had a switch in water and criminal refusal to do corrosion control of their water system.

So the -- what actually happened in Flint that didn't get headlines that you only know about like if you're in this field, or you live in Michigan, is that 12 people died Legionella from the lack of corrosion control of that water system, because all that extra metal there ate up all the chlorine. And it wasn't -- they weren't -- they kept adding chlorine, but they weren't being able to effectively disinfect their water supply.

So do you know that? Did you know that 12 people died of Legionella? It's like we're in this field. And so it's just sort of -- it's very overshadowed by the fact it's an environmental justice, very poor community that had a lot of economic justice issues as well. And it's very easy to build the narrative of an additional victimization. And the one doctor who's a wonderful public health champion, she probably had 10 percent of her patient population highly affected. And overall, in the city, it might have been like four percent or two percent.

But, you know, so from her perspective it was a epidemic of poisoning. But from a broader epidemiological perspective, it really isn't very different than what was going on anywhere.

So the purpose of their epidemiology was to show over 16 years there's actually been quite a reduction of lead poisoning in Flint, Michigan as a public health success story. So they're trying to reframe it to kind of give the community back a sense of health, even though they don't really still have their pipes free of all the corrosion products that happens.

I just think that's sort of the field you're in and that's the question you're asking is how do you take this issue that the press just runs away with, and that different people from their health perspective, you know, add to? And I think that that story could have been framed as an environmental justice story without the stigma. Just nobody had the distance and the perspective to do so at the time that it happened.

CHAIRPERSON SCHWARZMAN: I'm interested to hear about several of you have mentioned kind of wanting to be able to provide guidance. So what the community wants is guidance about what to do. I mean, also like if you could tell me how bad it is, and what are my risks? That's desired also.

And it reminds me of a -- I was once on Michael Krasny talking about, you know, issues of chemicals, and chemical policy, and chemical pollution, and chemicals in people. And, you know, it's a call-in show, which I hate --

(Laughter.)

CHAIRPERSON SCHWARZMAN: -- being on, because then people call in and ask questions, and you have to try to answer them on the fly. And somebody called in talking about a bunch of chemicals that are in people, and what to do about that. And you walk down the aisle of the hardware store and there's all these products that are chemically intensive, and what you do do?

And I started giving some response that I thought was helpful. And he interrupted me to say, I'm talking extraction, like what methods are there to get the chemicals out of my body.

And he was a man, so I couldn't recommend he breast feed --

(Laughter.)

CHAIRPERSON SCHWARZMAN: -- which, you know -- anyway. So I think that those -- it was sort of a colorful experience, but it mirrors what a lot of people want, of course. But the -- what the communities are asking for and not getting from us I think tracks very

closely to what we don't know. You know, so it's not just like somebody is withholding information, or maybe not even just like that it's a communication problem. But that's -- that's some of the major missing pieces of the puzzle is like you have been exposed to this chemical. We don't actually know how much is hazardous. We don't know all the health effects associated with it.

We have some information about like the most serious outcomes from high level acute exposure for some compounds. We have some idea for lower chronic exposures to metals. But for most chemical exposures, and particularly in like the area that you're talking about, Katie, with, you know, kind of gas wells and where we don't know what all is in the extraction fluids, and there isn't disclosure around it, there's so many unknowns. And so it's not -- you know, the questions that you're asking is not just about how to -- how we communicate complex information to communities and individuals, but how do you deal with the fact that we don't know the answer to a lot of those questions. And when somebody says, you know, I'm talking extraction, how do you respond?

But I wanted to -- so I just sort of -- it's commiseration, more than anything else, that you are on the front lines trying to answer those questions that I only have to answer the occasional times that I'm on the

radio.

But that -- that there -- that it's big scientific gaps that are part of the problem about how to answer those questions. But that said, one of the things that I'm hearing is we need to do a lot better job of connecting the dots between the information that is out there and the people who are on the front lines trying to provide it.

For example, your question, Karen, about like a community that's concerned about breast cancer and the role of the environment in breast cancer, and how do I tell them what they might ask to be biomonitored for?

And I don't know how familiar you are with Silent Spring Institute's work. They're a frequent collaborator of mine on some chemicals in breast cancer issues. And I mention them because they're particularly a public-facing advocacy, education organization in addition to the science that they do. And they -- their website is wonderful and has lists of chemicals that are -- where there's good evidence connecting them to breast cancer risk, and of where there's suggestive evidence, but it's maybe not conclusive.

And so there is some information that helps bridge some of those. And you also in San Francisco have SFE, which -- San Francisco Department of the Environment,

who I'm sure you're in close contact with, but they're, you know, so uncommonly wonderful resource.

MS. COHN: They do a lot of toxic use reduction education.

CHAIRPERSON SCHWARZMAN: And just the -- just the internal resources that they have of information or access to information, because they are plugged into the network of scholarship I think more around toxics than is common in most city or county environmental departments or organizations.

Yeah, Tom. Or Did you have a response, Sara?

DR. CODY: I was just thinking of a question for you all. So with many different types of diseases, we might do surveillance and monitoring to better understand patterns of disease in the population. And then the question -- and it's not so much to -- it's not to direct care for a particular individual that we find. It's to understand what we need to do from a public health perspective, and particularly how it might translate to policy advocacy.

And so with the biomonitoring, is there also a infrastructure where you translate the biomonitoring results to policy advocacy, right? So rather than educating the public about all of the actions that they need to take, and all of the products that they need to

avoid, and navigate, et cetera, et cetera, is it translating to policy advocacy with, you know, various manufacturers or whatever? I mean, is there a way to sort of, in a systematic way, understand what the policy priorities are as a result of the biomonitoring?

CHAIRPERSON SCHWARZMAN: Did you want to response Sara or...

PANEL MEMBER McKONE: Is it on?

MS. HOOVER: It's -- you've been circling around something that I had in my mind too, because there's a lot of focus when we engage with individual participants about what can you do. And we try to offer that about possible actions. And we try to make it clear that we're giving you some ideas about possible ways to reduce exposure. But there are cases where we make it clear that it is a larger policy issue that we're taking about, like PBDEs have been spread throughout the environment. There are some things you can do.

But it's true that, you know -- and really a fundamental goal of the Program is to support regulatory efforts and public health efforts to reduce chemical exposures. And so that was raised in the morning session. And that's kind of something Lauren and I have talked about having more of a focus on really trying to do that translation about how do our results inform policy

priorities.

PANEL MEMBER SINGLA: Yeah. I'll echo that, just with the specific example of PBDEs and flame retardants, that there is -- the information and data coming from the Biomonitoring Program having been really important to inform policies, the local policies with San Francisco ordinance and the State level policies on flame retardants.

And I think it's a good segue too to a thought that I was having around the desire for, you know, what can be done about this? And I think Katie, in your presentation, you raised the issue of collaborating with enforcement agencies. I think it's a really important point that there's -- there are many factors that are outside of individual level control, and that when there's known sources of exposure that are due to lack of enforcement, that those issues are addressed. I think that's something that communities are really wanting and is very important to them.

MS. BUTLER: Yeah. And I think it's unfair to place that burden on the community, right, if there are already enforcement gaps. That is the agency's job. Just to finish that thought too.

DR. WU: I just wanted to add something to what Sara had said. And the California Regional Exposure

Study, what we call the CARE Study, is something that is surveillance across the state, that we are going to every county across California to try to get this baseline information of how people, how the population, is exposed.

And I think one of the findings of that is that everybody is exposed to -- we're all full of chemicals. And, you know, for many of our participants it's the first time they've thought about this, that consumer products, furniture, things that you eat do have chemicals in them. And for many people that can be at least the beginning of a politicizing moment, where they start to have an awareness that you need to look out for yourself. But more than that, you as a community need to think about whether that's a good thing that we trade-off things like convenience or, you know, non-staining things for a bunch of chemicals which may have these harmful side effects.

And the more you know about that, the more horrible it is. But everyone is going to take that first step, because otherwise it's very easy to live in a bubble and not think about it at all.

So I would say to you, we haven't gotten to your county yet, Sara, but we are working our way up the state. And I would be interested in hearing more about like how do we work with counties, who might not have the resources, to start building that awareness both at the

county health department, but in the population about what the CARE Study is doing.

DR. CODY: There's sort of two effective routes in. One is with community groups who can -- who can take -- who have an interest in understanding and then advocating. And the other is with the electeds, with the politicians, if -- so I know just the way it works in my county is if one of the board members of the board of supervisors had an issue that is near and dear to their heart, that they really care about, they can effectively advocate and make change and direct resources to an issue.

So sometimes it can come from the community up, and sometimes it can come from an elected down. It's harder and slower when it comes within a county look -- kind of like a local governmental health department. I think it goes faster when it's one of the other ends.

CHAIRPERSON SCHWARZMAN: So, Sara, you're saying we should biomonitor city council members and boards of supervisors?

(Laughter.)

DR. CODY: Go for it.

(Laughter.)

CHAIRPERSON SCHWARZMAN: Oliver.

PANEL MEMBER FIEHN: I wanted to raise another point that was mentioned before with the word "bubble". I

think we should be also careful and not to be too much in our own bubble, but clear that we talk about guidelines and limits of exposure and so on. That these are often meant with quite a bit of safety margins --

MS. HOOVER: Closer to the mic.

PANEL MEMBER FIEHN: And that these are meant with long-term exposures, not short-term exposures, that these are meant with -- you know, for example, for food or so, with exposures that are very much dependent on that source. And I say that, because I was a little surprised to see -- first of all, I didn't know that 80 percent of San Francisco, you know, had, you know, lead paint. But I was surprised that this was -- would lead to a -- you know, if I understood it correctly to a public comment saying, well, maybe we should hold back on public gardens and community efforts that bring the community together, in the sense of maybe your chickens and your eggs that you would get -- and your salads, would not be so fine.

Everybody who lives in the city would know that, and I think it would send the wrong signals to the community to then worry about, you know, the two eggs you would get, or these, you know, couple of salad -- salads you would -- might be possibly eat from the garden in terms of overall exposure.

So I think we should rather say, you know, yes,

this is an additional exposure to have, you know, food grown in the city, but the benefits in terms of having community around, having peers meeting, doing things together, for psychology, for, you know, antidepression effects to say, these are much more worse. And I would like to say that.

MS. COHN: Yes. We came -- we came out that side of the argument also. But we were perceived as police, because we have regulatory authority. So for every garden we decided not to use code enforcement as a tool, only education or free sampling, and always just to recommend raised beds, and imported soil, and to give people the management for doing that.

And, you know, most of the gardeners were already well aware of the issue, all the community gardeners. It's just that they all use an ag lab, UMass, and it doesn't really have the same standards as what the rest of us would use in this field. And so they have a false sense of confidence.

So it was -- you know, the fact about the one garden I showed is it was on YouTube with all the government officials, you know, doing the ribbon cutting and all that. And there was little kids who lived right next door digging and touching the wall and all that. So it was sort of like thinking about we want you to be

successful. We want you to have this sense of community, so let's try to avoid problems that might occur.

But it was very hard getting to know the gardening people, and to win them over, and to say we support you. We want you to be successful just for the reasons that you mentioned. And eventually, I think we got there. They link to our guideline now on their website, so...

CHAIRPERSON SCHWARZMAN: Did you have a comment, José.

PANEL MEMBER SUÁREZ: Yes. I have a question actually. How has -- have you been able to integrate or are you integrating technology into the way that you disseminate findings to your participants or to the community? Something that Meg brought up with the Silent Spring Institute is that they do have a biomonitoring study, which they can invite anybody that is willing to pay $300 to send their urine. And you send it in there, and of course they measure all sorts of chemicals. And they have an app that you download. Of course, now everything is with aps, particularly with the younger groups, has really good traction.

And so then you can see exactly what your levels were compared to the rest of the group that was sampled there. And I think they also do comparisons with where do

you stand in relation to the rest of the United States that they have for that particular parameter using NHANES data. So tell me a little bit about that. Do you use any technology?

MS. COHN: Well, I don't do biomonitoring. But as far as the lead data, it's all on the State lead programs website. What's interesting is because of --

CHAIRPERSON SCHWARZMAN: In PDF form. I might note in PDF form, except for the last year.

MS. COHN: It's not great. And believe me every time we want to analyze something, they say, oh, it's right there for you, but actually we can't access it. So it's -- they did -- because of the Reuters article, they, in 2012, looked at all of the cities and counties that had more than 250 children tested in a certain zip code, and they also gave us the rates of case finding. So I have four zip codes that were just as bad as Flint. But I have no way to repeat that data every year to show improvement. It's just like they did that analysis once. So that's what I would want to share.

MS. BUTLER: I would say this is an area where we fell short in the response to Aliso Canyon. We were very much emersed in emergency response mode, and we did not get ahead of the health messaging. We could have utilized social media more effectively. The communities around

Aliso Canyon are very much engaged in all technology. They're very savvy on their phones.

And so we had a real challenge getting our health message out ahead of the gas company's health message, and ahead of any other group's health message. So that's an area that now we're taking a really hard look at to see how we can do better, you know, in the future.

CHAIRPERSON SCHWARZMAN: Yeah. Eunha.

Eunha, go ahead.

PANEL MEMBER HOH: So I'm just switching gear to a different subject that I was interested in Karen's presentation the herbal supplements study that.... I thought it was very interesting. I mean we kind of understand that over general population are exposed to the chemicals, you know, that we probably have to try to lower, try to change the regulation, or policy, or something, you know.

But certain population they kind of exposed to take certain products, you know, like this kind of herbal supplement kind of stuff. So I kind of -- I think it's very interesting something in that out of radar, you know, that maybe some minority are more -- could be more exposed to. So I kind of want to hear how that study, that project was initiated?

MS. COHN: I think we just had the one case. And

that I brought it to the county lead program's meeting for Northern California and they had many cases amongst them. So everybody wanted to use whatever newsletters we published. And, you know, we can give it out to the medical community. And I guess I don't believe that San Francisco has an ethnic press that's related to that population, but maybe in the East Bay there is.

I mean, that would be the -- to really like start a community discussion. But the nurses who have been most involved with it are public health nurses in Fremont. And they felt there's a lot of shame to talk about it. Your child's lead poisoned. Somebody is coming to your house. And then it takes a long time for people to acknowledge that they've used this type of imported products. And it could be true for Chinese medicine, ayurvedic medicine, any, it doesn't really matter.

So -- and then some of those ones on that slide were just like health food stuff, like, you know, natural food companies that compounded their own things. And we've recently read that Viagra was in some of the pills that people are selling over the counter, right?

So it's just that kind of -- it could be anything. So -- but it turns out right now that because we're so proactive to go respond to any lead level, that our high lead levels are almost exclusively direct

ingestion of some type of supplement, cosmetic, imported product. And so it's very easy -- I mean, the only exception might be that somebody in the home is a contractor, or a did a do-it-yourself project in the home.

So there's a lot of that take-home type of exposure construction dust. But usually, it's some sort of cosmetic that's used traditionally or these medicines. And also, you know, there's a lot of medicines that you take the medicine for the very symptom that you're going to cause. You know, it's like a cyclic thing. And the Mexican home remedies were that way as well.

But there's just a lot of stuff that's been adulterated. The lead weighs something, so you can make more money, if you're selling it by the pound in an open market somewhere. It's just a -- that's how it works.

DR. WU: Just quickly, we also had some cases coming in to the Environmental Health Investigations Branch, not through Biomonitoring, that are coming from the use of ayurvedic medicine with high mercury. And arsenic drops -- or mineral drops that you add to water to boost the mineral content of your water, which turn out to be very high in arsenic that you can buy at Amazon -- on Amazon.

So there is, you know, a plethora of products out there that people are unaware of. They're not labeled or

they're certainly not labeled with these particular heavy metal contents that people really unaware of, that they're, first of all, not effective, but also that they can carry these health burdens.

On a more population basis, we did ask quite a bit about traditional medicines in our ACE Study. And as Lauren had said, we haven't gotten to that point of the analysis yet, but we will be looking at that.

PANEL MEMBER HOH: That will be really interesting.

CHAIRPERSON SCHWARZMAN: I wanted to return briefly to this issue that Karen raised about people being motivated through their children's health issues. And it's something that we've seen in working in the occupational health setting too, I think, that there tends to be a mentality of like, well, I'm tough, and I work in this high exposure field. But when you start explaining to people about biomonitoring of kids and what the results are of that, it gets very motivating, because it feels unjust, and people are very protective about their kids.

But it's a thorny issue for biomonitoring, because IRB approval is so much more difficult to get for studying kids. And then like NHANES has only gone down to age six. And I think now they're doing urine for down to age three, right? But that's new that they're adding down

to age three, but you can't really justify taking blood from little kids.

And so it's just a -- I just wanted to return to it, because it's a powerful kind of action angle, but it's also difficult from a biomonitoring perspective. Not technically difficult, but in terms of constructing and conducting studies with consent and IRB approval. So those things are kind of -- it's an inherent contradiction a little bit.

MS. COHN: Well, as an interim measure, could you provide the adult with a letter for the primary care physician that the physician could order the tests?

Because the lead test is definitely covered by all insurance. But if there's a justification, I imagine a mercury test might be also. And so the primary care could order it for the child.

CHAIRPERSON SCHWARZMAN: You mean for sort of targeted metals measuring, that would be tricky.

MS. COHN: Because, okay, this family got their exposure through the fish, and we want to find out if the child also got it. So try to make it part of their normal health care to find out, but have it be something --

CHAIRPERSON SCHWARZMAN: That's an interesting point for metals. I think it only would work for metals --

MS. COHN: Yes.

CHAIRPERSON SCHWARZMAN: -- because those are treated clinically and the other exposures we're looking at are not.

MS. COHN: Yeah. But it seems like it's almost like an ethical obligation to give the family a way to follow through with it for their child's health.

MS. BUTLER: Yeah. I was thinking along those same lines of public health intervention possibly. After you get an adult's results, if they exceed a guideline, then now there is a public health obligation maybe to partner with that local agency to, you know, talk to the family about having their children tested.

MS. HOOVER: I just wanted to note the time and that we should call for public comment. And I can tell you there's no public comment from the web.

So any public comment from the room?

No. Back to you.

CHAIRPERSON SCHWARZMAN: Thank you for that.

So Tom has one last thing. So I think we actually have a tiny bit of wiggle room, and we'll -- Tom, and then we'll move on to Lauren's closing remarks.

PANEL MEMBER McKONE: One thing that came up in the presentation that I don't think we followed up on is pathways. And in particular, the -- you know, when people

are worried about something, you know, there's first a question of, well, how bad off am I? But the other end is how do I limit my exposure? And you can't do that if you don't understand the pathway.

There's been a lot of mistakes made. I mean, going back to early on we were looking at in California drinking water standards. And the assumption was you're not exposed, if you don't drink the water. And so people got bottled water, and then we did these experiments that showed volatile chemicals. There were getting six liter equivalent ingestion from a shower, just by inhaling the fumes coming off the water unrelated to temperature. People thought, oh, I'll take a cold shower. Not true.

And then, you know, there's a lot of danger about misinterpreting pathways both ways. I mean, people assume like that if they live near a field where there's pesticides use, that that's going to dominate their pesticide exposure. We have data that shows unless you're really close, you're probably still getting most of your pesticide from food residues that are in the marketplace. It's not coming from -- which was really surprising.

So we have to understand this, because -- I mean, this is a big challenge for us, and I think for you too, is that it's very easy to misinterpret pathways and to assume pathways are not there that actually are there, or

to actually have people say this is a pathway. I'm worried about that it's not the right one. It's like what they're putting on their faces.

So I don't know if there's thoughts about how to move forward. But I just think we should put it on our agenda as something that's going to be very important to communicate to people, because that's how they protect themselves or would want to know how to protect themselves.

CHAIRPERSON SCHWARZMAN: Thank you.

We do have one public comment. All right. You can come to the podium.

MS. BADE: So, hi, My name is Ludmilla Bade. And I am actually a member of the public.

MS. HOOVER: Speak into the mic

MS. BADE: Like this one? I'm confused.

MS. HOOVER: I thought you were going to -- here you go.

MS. BADE: Okay. Scary.

(Laughter.)

MS. BADE: I'm Ludmilla Bade, okay, and I'm a member of the public. I currently live in Oakland.

And thank you, thank you for all the work that each of you do, and your departments do, and everybody does.

I do want to confirm that, yes, my concern is what do I do about it? I'm extremely -- I'd be extremely interested in knowing more about what plants could help purify my air, and help mitigate the effects of air pollutants, industrial auto, building -- you know, building materials, everything.

I'm interested in, of course, the NASA study that was done on indoor plants. It was done in '89. There's some very good information there on some easy-to-grow house plants that are good on an indoor environment. I would love, love, love to see more information on outdoor plants that could be planted in the small garden areas that we have in Oakland that people could put on rooftops, balconies, you know, different garden areas. What type of plants, trees, groundcover is helpful in mitigating just the whole pollutants that we have. That's something that people could do with, you know, $25 and, you know -- you know, just, you know, to grow a plant.

I'd -- I'm also interested in filtration systems. What kind of filtering works well to reduce the amount of pollutants coming in. I'm particularly interested in ones that don't require power. I'm actually one of the -- I've moved -- I had to move out of my house about six months ago, so I'm actually in a small trailer on the streets in Oakland. So I'm actually getting -- I'm getting to be a

tourist in Oakland, and kind of see different environments.

But I'm actually on the street and I don't have electricity. So it's -- it would be -- you know, is there some kind of filtration thing that I could use to keep so much of the grit and air pollution from coming into the trailer just so I sleep better?

And just anecdotally, I have -- I've put like a small vertical garden at the front of my trailer, which, you know, is on a pallet, and I've got plants hung in there, and I'm, you know, putting some of the plants in there. So I'm experimenting with this on my own. But I -- but I think that's kind of a situation not everybody would be in, you know, as far as not being in it -- in a fixed home.

On the other end of it what you said about not having a baseline data, you know. I agree. You know, if I'm going to my employer, and I'm saying, look, I'm getting a toxic effect from the amount of air fresheners that you all are putting in the restrooms here, there's no baseline data that that could refer to. I can't take -- I can't take it and -- you know, and do it as a work injury, and go to their doctor, and get a definitive thing of like, no, I can't be around this.

You see what I mean? It all becomes all kind of

fuzzy, and I'm a problem child, or something. So anyways. But as far as all kinds of -- if we knew what was in the population more, that would be very, very helpful.

Is there anyway to get like a broader sampling of people? Could I -- if I were giving blood, could I -- if I were part of a study, can I just say, yes, any -- you can use this for any study that you want and share the data, if I'm part of a study, or can you take sample -- could people volunteer to give samples just so you have that.

Because in order to implement solutions, you kind -- it would -- it seems it would help a lot to have that comparison.

Does that help? Any questions for me? Any of you all want to know what's happening on the streets of Oakland?

(Laughter.)

MS. BADE: All right.

CHAIRPERSON SCHWARZMAN: Thank you for that. I think we --

MS. COHN: Grateful you made it to this meeting.

MS. HOOVER: Thank you so much. I'll say one -- I'm just going to respond to yes. So in terms of donating a sample, definitely. We save samples, and we can test, and we actually ask people can you donate your sample, and

-- if we want to use it in the future? And the vast majority of people do opt into that.

MS. BADE: Great. Thank you.

CHAIRPERSON SCHWARZMAN: I'm going to turn over to the next part of the meeting, which is for Lauren to give some wrap-up, and particularly about sort of action items. And then we'll move on to topics for 2019.

DIRECTOR ZEISE: Okay. So I'm going to make it pretty quick. We had a really rich and wonderful discussion today, in the morning and in the afternoon both.

And so in the morning, I'm just going to say a few highlights of the discussion. One of the issues around priorities for funding that came up in different ways was, you know, how do we -- how do we leverage with academia and other funding sources? And I think as an action item, we heard this actually at a previous meeting as well. And so certainly something for the Program to -- to explore further than we -- than we already are.

Another was just thinking in terms of priorities, in terms of regulatory effectiveness and directing resources to answer real regulatory questions, and that that -- in terms of getting support for the Program, we can see how we might better go about doing that.

And as part of that, there was a -- the point

made that we really need to maintain some of the older analytic panels, so as we look at swapping in different kinds of panels that we also need to think about historical data, because that gives us information on regulatory effectiveness.

There was real encouragement for engagement with academia, in terms of the non-targeted analysis. And a good deal of discussion around the challenge of maintaining complex equipment. And that efficiencies are to be gained even with using some of the older equipment. But the whole idea of how best to juggle our limited resources is something that came up in a few different cases.

So let me just move to -- I think we just heard a very rich discussion with the counties. And one of the key issues that we heard was around youth. Youth as both interns -- youth interns to help disseminate information, can be particularly effective, but also in performing the biomonitoring and testing of children, that can be effective too. But, of course, we are limited in our ability to do that.

Tom brought up the issue of chemicals that are harmful versus unharm -- harmful chemicals versus just exposure to chemicals that aren't at harmful levels. And that levels of concern are something that -- you know,

when we look at what we've done with the metals, in terms of report back, most of the metals do have levels of concern. So we actually know, as we return results to the community, we can point out those levels that are harmful. But for the most part we can't do that, and we had a number of comments around how we go about framing the results as we do report back to the community.

And let's see. So the issue of what is normal, and how to discuss it. And in many of our reporting back we frame the results in terms of levels that we see at the national levels, and levels we see in the particular study. But, of course the -- that, in many cases, we are uncertain about what is harmful. So I think Meg made the very nice point about how we can do a better job of potentially framing the report back, so that in a way that we begin to talk about the uncertainties and their response, and help use existing information to bridge the discussion of uncertainties.

And I guess I'll stop there. Thank you.

CHAIRPERSON SCHWARZMAN: Thank you, Lauren.

For the remainder of the time that we have, we're going to do two things. One is that Sara Hoover will discuss possible topics for 2019. And I just want to mention now that after that there is a time for final public comment.

And so the opportunity is not gone yet. And if you're listening on the webinar you can send it in, and we'll revisit that after Sara presents.

So Sara Hoover, is Chief of the Safer Alternatives Assessment and Biomonitoring Section at OEHHA. And she will give a brief presentation on the topics for 2019 SGP meetings.

MS. HOOVER: And instead of blinding you with the projector, if you can just pull out your sheet, if you have it in front of you, but it's a very brief presentation. So we always do this every November. We kind of foreshadow the next year and start thinking about planning the agendas for the three meetings. And I'm pleased to announce that we've already set the meeting dates. So the next meeting is March 6th in Sacramento. Then we have a summer meeting on July 25th hopefully in Oakland, and then November 6th also in the Bay Area with the specific location to be determined.

And I'm very excited that we actually have a plan for the March meeting already. And that will include our usual program update. And then we're going to have a special session with our special guest speakers, i.e. our newest SGP members who have all agreed to present on their results in their particular research that they think will help inform the Program.

So we're going to hear from José Suárez, Veena Singla, and our newest member Eunha Hoh. So thank you all for agreeing to that. That's going to be a really interesting and different kind of session.

In terms of the remaining two meetings of the year, you've seen the approach we took this year, we had a big focus on reporting back on study progress and study findings. So it's really exciting that we have such a great group of analysts in EHIB and Nerissa's group now, so they can really dive into the findings and start to analyze this rich data set we've collected.

So we're going to hear more about the Foam Replacement Environmental Exposure Study, or FREES. Kathleen Attfield in Nerissa's group has been delving into that data. And we're hoping to hear a presentation from her in the summer. We're also going to continue to hear updates and initial findings from the CARE Study. And later in the year, we hope to present some information from our East Bay Diesel Exposure Project, which did include biomonitoring of children. So that should be really interesting.

As I mentioned this morning, we are open to considering some chemical selection items again. As you know, the -- we've been very resource restricted in terms of what the labs can take on. So we put chemical

selection on hold. We also have a very complete list of designated chemicals, in part because we take this approach of listing by chemical classes.

But one idea that actually Lauren brought up is to take a look at fluorinated compounds, other than PFASs, because some of those have been coming to our attention. And we would propose doing a preliminary screen. So that's where we bring some initial data to the Panel and you decide if it's something we should pursue more formally.

And then we'll continue to track possible candidates to look at for biomonitoring, including, for example, if you remember our March meeting we engaged with the California Air Resources Board about work they're doing. So we want to track potential air pollutants of concern in impacted communities across the state. We also had a great engagement with the Water Board at the last meeting, so we want to continue to keep track of any emerging water pollutants that might come up. And we do maintain a close relationship with the Safer Consumer Products program. So we'll keep looking at any emerging consumer product chemicals, new substitutes, things that are cropping up.

So again, if anybody listening, or anybody on the Panel, or our guest discussants if there are any chemicals

of interest that you can think of, please feel free to email those to us.

In terms of other topics, the two things I flagged is to just -- we need to continue to have a conversation about program priorities, because we're going to continue to face restricted resources, as far as we know, in the near future.

And then usually we have -- once a year we have visitors from CDC. So we can think about topics we might want CDC to address.

So that's what I pulled together. Panel members and the public are welcome to propose, to comment on these, propose additional 2019 SGP topics. I think we actually have a few minutes, if anybody wants to make comments or if there's any public comment.

CHAIRPERSON SCHWARZMAN: Can I ask you a question, Sara?

MS. HOOVER: Sure.

CHAIRPERSON SCHWARZMAN: What comes to mind from recent meetings with the CDC visitors is VOCs and non-targeted screening have been two recent presentations from CDC. What am I missing. So we're not asking for --

MS. HOOVER: No, CDC has not presented on non-targeted screening.

CHAIRPERSON SCHWARZMAN: Okay.

MS. HOOVER: That's not their focus, but VOCs.

CHAIRPERSON SCHWARZMAN: VOCs. And was there -- what was the last CDC visit before VOCs were the topic?

MS. HOOVER: Well, actually the last topic was Antonia, PFASs. And then Victor De Jesus presented on VOCs. So those are the two.

CHAIRPERSON SCHWARZMAN: So PFASs and VOCs.

MS. HOOVER: But what we -- what we typically do, Meg, is we think about, you know, a topic of particular interest and who at CDC might address it, and then we target a person to invite out.

CHAIRPERSON SCHWARZMAN: I just wanted to put in our consciousness as we consider this what our recent topics have already been.

MS. HOOVER: Okay. Well, and I can come up with a more complete list of what we've heard from and what we might want to touch back in on. And a lot of it is driven by which CDC scientist can come, and what their particular focus is right now.

CHAIRPERSON SCHWARZMAN: It's the end of the afternoon, but any questions for Sara, or the Program, or ideas about possible priorities or things you'd like to hear about before making -- having ideas for possible priorities.

Yeah, Karen.

MS. COHN: Are you able to do bacteriological biomonitoring?

CHAIRPERSON SCHWARZMAN: You said bacteriological?

MS. COHN: (Nods head.)

MS. HOOVER: No.

CHAIRPERSON SCHWARZMAN: I think it's --

MS. COHN: A lot of research going on, about asthma prevention.

MS. HOOVER: I mean, we have looked at antimicrobials, you know, as a class, but it's really, you know, the environmental contaminant. Our list is designated chemicals. Yeah.

MS. COHN: It's about the microbiome, and --

MS. HOOVER: I mean, I said no really -- I said no really flippantly, but, you know, if there's a -- if there is a link, you know, a particular chemical link, we could look at something like that.

MS. COHN: I have to have a chemical attached to it.

MS. HOOVER: Yeah. But that's not unheard of. You know, that could be an interesting thing to delve into.

Lauren, did you --

DIRECTOR ZEISE: Oh, no. I just had an idea that

I think this morning we heard about health tracking and leveraging with studies that are also looking from an epidemiological point of view. And I just wonder if there might be some opportunities for, you know, tracking certain, maybe the PFAS or something and marking it with sort of upstream biomarkers of lipid metabolism or something such as that.

MS. HOOVER: Yeah, like the comment that Meg made. So, yeah, we could consider, you know, maybe a theme of fluorinated compounds, but also looking at some of these interesting -- a guest speaker on something like that, yeah.

CHAIRPERSON SCHWARZMAN: Taking off on Lauren's idea. You know, the weakness of epi studies is usually exposure assessment. And that's the strength of biomonitoring. So I think that's an interesting link to pursue just because it's so fruitful in terms of the evidence that it potentially generates.

And the question is like finding an epi researcher who has funding who wants to improve their exposure assessment through biomonitoring and can support biomonitoring. But I'd be interested in thinking along those lines a little bit.

MS. HOOVER: Yeah, good idea. And any comments or particular reactions to the list I did put out? Do

those sound interesting and useful?

Yeah, nodding is fine.

CHAIRPERSON SCHWARZMAN: I have one other thought about your mentioning air pollutants. And it's not necessarily my particular area of expertise, but I've seen a couple papers recently just connecting to Karen's idea about current interest and funding for pre-term birth studies. And there's recently been a little flurry of literature around toxic air contaminants, and PM, and preterm birth. And that's where my expertise ends, but it might be worth thinking in that direction.

MS. HOOVER: Yeah. Great.

CHAIRPERSON SCHWARZMAN: Okay. Any -- no public comment from the web.

Any comments from the room before we close just a couple minutes early?

Okay. So thank you all for the really rich conversations today. It was particularly interesting. I love getting to hear results, and results analyses. That's always like -- it's like the candy, right? We spend all this time talking about conducting studies, and how it's going. And hearing about the results and the analyses is really fun.

And then to connect with colleagues in a different scale -- not scale, but like locus, not State

level, but county level and city level coming with a different charge, but overlapping, and the concerns that you're addressing, I think, really enriches the conversation. So thank you to everyone.

And to the staff for putting together this meeting and preparing us as a Panel so thoroughly, and making our job really easy.

So with that, I will wrap-up and adjourn the meeting. I'm supposed to announce that a transcript of the meeting will be posted on the Biomonitoring California website when it's available. It's usually not long before the next meeting, right, is often the timing of it.

And the next SGP meeting, as Sara mentioned, will be in Sacramento on March 6th, 2019. And with that, I'll just thank everybody, the Panel, our visitors, and the staff and adjourn the meeting.

(Applause.)

(Thereupon the California Environmental Contaminant Biomonitoring Program, Scientific Guidance Panel meeting adjourned at 4:42 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 25th day of November, 2018.

JAMES F. PETERS, CSR
Certified Shorthand Reporter
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