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

THE CALIFORNIA ENDOWMENT

LAUREL ROOM

2000 FRANKLIN STREET

OAKLAND, CALIFORNIA

WEDNESDAY, NOVEMBER 6, 2019

10:01 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

Oliver Fiehn, Ph.D.

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

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

José 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, Safer Alternatives Assessment and Biomonitoring Section, Reproductive and Cancer Hazard Assessment Branch

Heather Bolstad, Ph.D., Staff Toxicologist, Air and Climate Epidemiology Section, Community and Environmental Epidemiology Research Branch

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

Duyen Kauffman, Health Program Specialist, Safer Alternatives Assessment and Biomonitoring Section, Reproductive and Cancer Hazard Assessment Branch

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH:

Kathleen Attfield, Sc.D., Research Scientist III, Exposure Assessment Section, Environmental Health Investigations Branch

Robin Christensen, Sc.M., Chief, Biomonitoring Investigation and Outreach Unit, 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

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH:

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

Adam D'Amico, M.P.H., Research Scientist II, Exposure Assessment Section, Environmental Health Investigations Branch

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

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

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

June-Soo Park, Ph.D., Chief, Environmental Chemistry Lab

PRESENTERS:

Terry Allen, Air Pollution Specialist, Community Planning Branch, Office of Community Air Protection, California Air Resources Board

Heather Arias, Chief, Community Planning Branch, Office of Community Air Protection, California Air Resources Board

Asa Bradman, Ph.D., Associate Director, Center for Environmental Research and Children's Heath, University of California, Berkeley

Brian Moore, Air Pollution Specialist, Community Planning Branch, Office of Community Air Protection, California Air Resources Board

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

ALSO PRESENT:

Nancy Buermeyer, Breast Cancer Prevention Partners

Anna Reade, Ph.D., Natural Resources Defense Council

Anna Scodel, California Air Resources Board

Chris Simpson, Ph.D., M.S.C, University of Washington

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: All right, everybody. Thank you for coming. Go ahead and have a seat. We're going to get started. And before we get officially started, let me just run through a few logistics.

First, my name is Russ Bartlett. I am with the Office of Environmental Health Hazard Assessment. So today's meeting is available via webinar. So for the benefit of those listening to the webinar as well as our transcriber, please speak directly into the microphone -- please speak directly into the microphone and please introduce yourself before speaking. Copies of the presentations and the agenda are available in blue folders. So if you haven't grabbed one, go ahead and grab one. They're next to the door.

Today, we will break at 12:45 p.m. for lunch. And restrooms are located just where the Panel is just to our left of the Panel. Go ahead and exit that door and it's immediately to your left. In the event of an emergency, just across from my location to the other side where the silver trash cans are, there's an emergency exit door. When you enter that door, immediately to your left, another left, and you'll be put out right here on Franklin Street. So for Panel members, you guys can go through the restroom door to the left and then to the right, and then

you'll see a door to exit right out on Franklin Street.

Without further ado, I'd like to introduce Lauren Zeise, Director of the Office of Environmental Health Hazard Assessment.

DIRECTOR ZEISE: Thank you, Russ.

I'd like to welcome everyone to this November 2019 meeting of the Scientific Guidance Panel meeting for Biomonitoring -- for Biomonitoring California, that is the California Environmental Contaminant Biomonitoring Program.

Thank you all for participating, listening online, coming here. And thank you for -- to the Panel for sharing their expertise today.

We've got a great meeting planned. I'm really looking forward to today's presentations and discussions.

Just to recap our last meeting, our summer meeting. After hearing a program update, the Panel reviewed six Program priorities that are going to be included in the next report to the Legislature on the Program. And recommended adding a seventh, and that is conducting biomonitoring studies that are designed to help evaluate the effectiveness of regulatory programs.

So flame retardants were the main focus of that meeting. We heard results from the Foam Replacement Environmental Exposures Study, also known as FREES. Had a

very good discussion of those results. These included results for polybrominated diphenyl ether, or PBDEs and organophosphate flame retardants and results from analyses of house dust in furniture foam.

Then Gina Solomon, who is a former member of this Scientific Guidance Panel, provided an overview of a class approach to hazard assessment of organohalogen flame retardants and general thoughts about how to apply class approaches to chemicals.

And then there was a general open discussion on next steps for the Program with regard to flame retardants, including approaches for chemical selection and possible future studies.

So the Panel also reviewed a preliminary screening of the class of quaternary ammonium compounds, or QACs, and recommended that OEHHA proceed with developing a document on QACs for consideration as potential designated chemicals. So stay tuned for that.

And then a summary of input from the science -- from this July meeting of the Panel, along with the complete transcript is posted on the July SGP meeting page on Biomonitoring.ca.gov.

And now I'll hand off to our SGP Chair, Meg Schwarzman, who will provide more details about today's meeting.

CHAIRPERSON SCHWARZMAN: Thank you, Lauren, and thank you to everybody who worked to put this meeting together. It's a very exciting meeting, because we get to hear a bunch of results and I'm really looking forward to that.

So our goals for this session in this morning, we'll receive first a Program update and hear the initial results from the CARE-LA study, the California Regional Exposures Study and that's the L.A. region, and the East Bay Diesel Exposure Project. And after each presentation, there will be a brief time, about 10 minutes each for questions. And then there will be, after both presentations, an hour for discussion of those results just to sort yourselves about what input goes where.

After lunch, we'll hear from staff from the California Air Resources Board, who will provide an update on the implementation of the Community Air Protection Program, which is established under Assembly Bill 617. And they will be highlighting examples from AB 617 communities.

The afternoon discussion will explore next steps for biomonitoring under AB 617 community -- or in AB 617 communities, including the goals of those studies and considerations in selecting communities to study.

We will at the end also review possible topics

for 2020 Biomonitoring SGP meetings. And the last item of the day is a public comment period that's open on all topics, not just topics of the day.

So today, we're not going to be using comment cards, because we want the discussion to be a little more free flowing. If you want to speak during either question or discussion periods, you can come to the podium, sort of line up along the podium. You can raise your hand. I'll call on you at the appropriate moment. For the benefit of the transcriber, we do need everybody to be at a microphone and please clearly identify yourself before providing your comment and also write your name on the sign-in sheet, so that the transcriber can refer to that.

If you're joining the meeting via webinar, you can provide comments via email. The email address is on the screen right now. It's Biomonitoring@OEHHA -- that's O-E-H-H-A, .ca.gov. And we'll keep an eye -- staff will keep an eye on the email and pass along any relevant comments that we'll read aloud. Please keep in mind keeping your comments brief and relevant to the topic at hand, apart from the open public comment period at the end.

So I'm going to start by introducing our morning presenters. Nerissa Wu could not be here today and so she is being replaced for the time by Robin Christensen. And

I appreciate you're stepping in.

Let's see. So Robin Christensen is Chief of the Biomonitoring Investigation and Outreach Unit in the Exposure Assessment Section in the Environmental Investigations Branch at the California Department of Public Health. And she's presenting the material that Nerissa Wu had prepared. This will be the Program update and some of the CARE-LA results.

And that's followed by -- she'll be followed by Jennifer Mann, who is a Research Scientist in Nerissa's group at CDPH. And Nerissa -- sorry. So she will follow Robin with more on the CARE-LA study.

MS. HOOVER: You might want to hold it.

(Thereupon an overhead presentation was Presented as follows.)

MS. CHRISTENSEN: How about now?

So hello, everybody. Good morning. And thank you all for joining us here today. And as you have heard, Dr. Wu is unexpectedly out today. I think she may be listening in right now. So we could hear from her through the Biomonitoring email. She wants to express that she is so very sorry for unexpectedly not being here today. And I hope that I do her slides some justice.

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MS. CHRISTENSEN: Okay. So starting off with the

Program budget here. Our current fiscal a year, 2019-20, reflects State baseline funding. And to put it bluntly, this is our lowest Program budget since 2008. This means that we have some pragmatic and some potentially difficult decisions to make in our future. And we alluded to those at our last meeting in the summer.

But as dire as this chart might appear, it does not tell the whole story. We are far better equipped in 2019 than we were in 2008. We have staff, instrumentation, methods, and a full Biomonitoring Program. We have a statewide biomonitoring study in CARE and we have innovative targeted studies, such as EBDEP, which you'll be hearing about later.

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MS. CHRISTENSEN: So speaking about the CARE study. Here, we have the CARE timeline. We are currently in a rather hectic phase right here, where we're somehow working in three regions at once, which, as I mentioned before, is an administrative and a logistical headache. But fortunately, the bulk of the work here is actually being carried out by four separate teams. CARE-LA is being led by the epi and stats team who are busy digesting the data and doing analysis. CARE-2 is being handled by our two laboratories. And our CARE-3 outreach team is currently working in San Diego and Orange County to make

connections within the community.

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MS. CHRISTENSEN: So I want to -- for most of the talk today, Jennifer and I will be focused on CARE-LA results. But I want to start off by highlighting a case -- a recent case from Region 2 that helps to illustrate the impact that our Program can have.

One of our study participants in Region 2 was experiencing some symptoms that caused her to talk to her physician. She was feeling generally off, her weight was down, her blood pressure was up, she was irritable, having trouble sleeping, her hands a little bit shaky. She mentioned that there could have been some balance issues, but she wasn't quite sure. You know, it was -- it was kind of vague.

So her doctor didn't actually find any specific cause. And none of these symptoms are -- they're -- they could be fairly common. She was getting a little bit older. Her doctor prescribed some medication for the blood pressure and provided her some guidance and sent her on her way. They agreed to follow up later.

What the doctor did not know was that her urinary mercury level was over 80 micrograms per liter. This is four times over our level -- four times our level of concern for mercury in urine.

The symptoms associated with exposure to mercury include tremor, irritability, memory loss, and nervous system disturbances. Mercury can affect brain development. It can harm the nervous system and kidneys. And if the exposure persists, it can cause irreparable damage. Biomonitoring California has a protocol to follow up with all of the participants whose values exceed the level of concern, or LOC. We do this by sending a letter with their results and following up with a phone call. That phone call is an opportunity for us to discuss potential exposures sources with the participant and to offer guidance for how to reduce potential sources of exposure.

What we learned from our participant is that she was using a skin cream imported from Mexico. These skin creams are often marketed toward women looking for a clearer, smoother complexion. Mercury may be added after market. And these creams are often sold in non-traditional ways, such as by word of mouth or through an online marketplace.

Our staff suggested to her that she immediately stop using that cream. And we sent her materials that she could share with her physician, including information on how to receive follow-up testing and how to meet with her physician routinely to see if her levels would decline

over time.

So this is one recent example of how a biomonitoring study can help support clinical follow-up. But - and I'll get into this more later - about eight percent of our study population as a whole has at least one metal that exceeds a level of concern. Not all elevations require clinical management or follow-up, but all of our participants with elevations can benefit from increased awareness and education to reduce harmful exposures.

Eight percent of Californians is over three million people. That's three million people with potentially harmful levels of lead, mercury, arsenic, or cadmium. So imagine the impacts that we could have if we could increase awareness of environmental exposures across the state through the CARE study, if we could educate individuals, communities, and policymakers about common sources of exposures, and if we had data and evidence to back up those recommendations. We'll be sharing some of that data with you today.

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MS. CHRISTENSEN: And moving into the CARE Study. As you know, we have many different sources of data available to us. We collect demographic information on the initial interest form or pre-screen. And we collect

some personal data as well such as the reproductive history that is captured on our exposure survey.

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MS. CHRISTENSEN: But the focus of the exposure questionnaire is to really collect data on exposure sources. So this includes several questions such as: does your home have any paint peeling from the walls, how often do you wear stain-resistant, or water-resistant, or water-proof clothing, and as part of your diet in a typical week, how often do you eat shell fish, or potatoes, or fast food?

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MS. CHRISTENSEN: Our plan for analyzing the data is roughly broken down into the three phases here.

Results return comes first. We compare individual results to NHANES and the CARE study population as a whole. We look at the ranges. We look at central tendencies and detection frequencies. And then we develop an initial summary. This looks at the demographic factors one at a time. And this is the information that we have completed already and will be presenting to you today.

Our current task is to dive deeper into those exposure factors. Our data team is now building multivariable models with the parameters that have been found to be at least moderately significant. The

challenge for our Program is to continue to carve out enough time to do this.

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MS. CHRISTENSEN: So let's talk about the CARE-LA initial results. For all of the following slides, our comparison group is adults 20 and older from NHANES 15-16. And asterisks indicate significant difference.

So here we have blood metals. We found high detection frequencies, which is really not unexpected given the low limits of detection. We also found that lead concentrations were significantly lower in CARE-LA as compared with NHANES, while manganese and mercury were significantly higher.

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MS. CHRISTENSEN: For nine urinary metals, we had high detection frequencies for two-thirds of these metals here. But the detection frequencies for uranium, antimony manganese were below 65 percent, so we didn't calculate the geometric means and that's why you'll see the blanks in this table here.

The geometric mean levels of urinary arsenic, cadmium, molybdenum, and thallium were significantly higher in CARE-LA as compared to NHANES, while urinary cobalt concentrations were significantly lower.

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MS. CHRISTENSEN: Okay. So here we have the number of people with levels that exceeded our levels of concern. We have six LOCs for four metals, that's arsenic in urine, cadmium in blood and urine, lead in blood, and mercury in blood and urine.

Thirty-five of our 430 CARE-LA participants had at least one metal above a level of concern. Four participants had both arsenic and mercury exceedances, so these numbers don't quite add up to 35. As I alluded to before, this is about eight percent of our study population, which is very similar to what we found in the BEST study in the Central Valley.

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MS. CHRISTENSEN: So among CARE-LA participants, we did see some differences by race. Asian participants had higher blood mercury levels than other groups. This is typical in both California and in NHANES and it may be driven in part by exposure to mercury from food. Blood lead was higher in both Blacks and Asians as compared to Hispanics.

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MS. CHRISTENSEN: And, here we go. Again here, Asian participants came out a bit higher, higher blood cadmium concentrations than Hispanics and higher blood manganese levels than both White and Black participants.

You know not shown on this slide, but an interesting add-on to point out, both blood and urinary cadmium levels varied significantly by the participant's birthplace.

Participants who were born in Asia had higher blood and urinary cadmium levels compared to participants that were born elsewhere.

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MS. CHRISTENSEN: Oops, too far.

Okay. Here, we have chromium adjusted urinary arsenic by race. Again, we found that arsenic was higher in Asian participants as compared to the other groups. And similar to what we saw with cadmium, Asian birth place was also associated with higher levels of urinary arsenic.

Both urinary arsenic and blood mercury concentrations have increase -- or they increase with income levels. And this finding might reflect higher seafood consumption in higher income populations. Seafood is a known exposure source for both arsenic and mercury. This is just a hypothesis. We are testing this and we'll be looking at it a little closer in the next phase of data analysis.

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MS. CHRISTENSEN: Moving on to PFASs. We tested for 12 PFASs. And the seven shown on this slide were those that had detection frequencies above 65 percent.

The others are not included in the table.

So for PFASs we do see statistically significant differences between CARE-LA and the NHANES population. Now, this could be due to temporal trends. CARE-LA samples were collected in 2018. And unlike metals, we would expect to see that some PFASs are declining or changing over time.

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MS. CHRISTENSEN: When we look at PFASs by race, we learn that CARE-LA's Asian participants had much higher levels of certain PFASs as compared to NHANES, but still lower levels of PFASs than are ACE study participants. ACE is Asian-Pacific Islander Community Exposure Project.

We're not quite sure what that means yet. The ACE participants were a really different group. They live in a different region of the state and samples were collected at a different point in time. But our team will be exploring that further.

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MS. CHRISTENSEN: We see some other demographic trends in the PFAS data. There are some associations with educational level attained, and men have higher levels than women. Older participants also have higher levels than younger participants. So these are trends that have been seen in NHANES and elsewhere.

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MS. CHRISTENSEN: Moving on to the CARE-LA environmental phenols. This panel included bisphenol A and its analogs BPS and BPF, benzophenone-3, parabens, triclosan, and triclocarban.

Phenols was a late addition to the CARE study, so we ended up analyzing samples from only 60 participants, and all of them were women. So we selected the 60 samples equally between Asian, Black, Hispanic, and White women.

So two big caveats here looking at this data. This should be considered hypothesis generating. We can't surmise too much from this limited sample size. And we also know that there are temporal trends that exist for phenols. So for many of these compounds that could also be playing a role in what we're seeing here.

Despite these caveats, the comparison does show a significant difference between CARE-LA and NHANES for methyl paraben, propyl paraben, and triclosan.

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MS. CHRISTENSEN: A few other things were notable in the CARE-LA data. Within the CARE-LA subsample, Black women were the highest in methyl paraben compared to other races. This is consistent with NHANES and is also consistent with some community concerns about some products marketed toward women of color.

BPA detection was pretty low, just 47 percent, but BPS, which is used as a replacement for BPA in some products, was detected in 77 percent of our participants. BPF had a lower detection frequency at 23 percent.

BP-3 detection and geometric means were also high compared to NHANES. And this could be because -- let's see, I'm looking for the other slide. I don't know why it's left off here.

BP-3 detection and geometric means were also high compared to NHANES. This could make sense, because we're in California. BP-3 is used in some products as a UV stabilizer. And we have also found it's a common ingredient in sunscreen. So we found in FOX -- the FOX study, the firefighter study, that BP-3 levels were significantly higher than in the NHANES comparison group.

It's worth noting that our CARE-LA difference was not significant, because our confidence intervals are really quite large due to the small sample size.

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MS. CHRISTENSEN: Okay. Now, we're here. Okay. So before we transition to Jennifer, who's going to tell us more about 1-NP, I want to extend a big thanks to all of our staff, especially those on our data team. But really, everybody on this slide played a huge role in helping to bring this data here to you today.

And I would like to turn it over to Jennifer.

(Thereupon an overhead presentation was presented as follows.)

DR. MANN: Hi. Robin just gave you preliminary findings for metals, PFASs, and urinary phenols. And I'm going to be giving the first of two talks today on what happens when CARE-LA -- with CARE-LA results for diesel exhaust.

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DR. MANN: Sorry about that.

So diesel exhaust has been a topic of Scientific Guidance Panel meetings going back to 2008 when the Panel voted to recommend it as a designated chemical at the December meeting.

It was listed as a priority chemical at the following meeting in March 2009. And in listening sessions in 2016 with community and stakeholder groups, there was strong interest in biomonitoring of diesel exhaust exposures as well.

What slowed us down was how to identify the -- a good specific biomarker of diesel exhaust. In 2014, Chris Simpson presented to the Scientific Guidance Panel and he proposed metabolites of 1-nitropyrene as such a biomarker. 1-nitropyrene is the predominant nitrated polycyclic aromatic hydrocarbon emitted in a diesel engine.

Next came the launch of the East Bay Diesel Exposure Project, EBDEP, which you're going to be hearing more about after I -- my talk. And they were looking at -- one of the things that they wanted to look at was biomarkers of diesel exposure. And to do that, they wanted to use 1-nitropyrene. And they partnered with Chris Simpson's laboratory at the University of Washington.

The final thing that happened, which is what I'm going to be talking about today was we decided to add -- to look at 1-nitropyrene in a subsample of the participants of CARE-LA

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DR. MANN: So we looked at -- we sent urine for 159 participants to the University of Washington. And we looked at two metabolites, 1-nitro -- sorry, 6- and 8-hydroxy-1-nitropyrene. The subsample we high -- prioritized those samples that had the greatest urine volume, because our urine volume was not optimal for the lab analyses, so we -- that was the most important thing. But we also tried to balance by race/ethnicity.

All urinary results were adjusted for specific gravity. And this is one approach to account for participant hydration status. And it also helps us compare values within and between studies.

So, for example, when we try and compare values to other regions in California and with projects like EBDEP. And metabolites reflect exposures over the past several days.

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DR. MANN: So this is what happened to the samples that we sent to the University of Washington. So there were 159 samples. And starting on the left looking at 6-OHNP, there were 50 samples where levels were not reportable for that metabolite, leaving us with an N of 109.

For 8-OHNP, we only -- there were only 10 samples that were not reportable, leaving us with an N of 149, but note the difference in N between the two metabolites. And there were 105 participants that had results for both metabolites.

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DR. MANN: These are some summary statistics for both metabolites. These are posted on the web.

MS. HOOVER: Not yet.

DR. MANN: Not yet. These will be shortly posted on the web. You can see the geometric mean levels of 6-OHNP were higher than for 8-OHNP. We can also see some skew in the data for both metabolites, but in particular 6-OHNP, which means that we were going to be looking at

log-transformed values. And finally, you can see that the detection frequencies were not bad for both metabolites.

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DR. MANN: We anticipate since 6- and 8-OHNP are performed -- or formed by the same general metabolic pathway, that there will be -- the two will be correlated. And indeed overall, the correlation was 0.7, overall 105 participants. But we see a lot of variation by race. Pretty good correlation for non-white participants ranging from 0.78 to 0.97.

But for white participants, the correlation is 0.27 and is not statistically significant. Here, the red star means that the association is statistically significant with a p of less than 0.05.

We weren't sure why we see this difference in white and non-white participants. It may have to do with variation in metabolism. And it will be interesting to see if we see the same lack of correlation in CARE-2, and in EBDEP, and in other regions of California.

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DR. MANN: Another thing to note that as an air pollutant, 1-nitropyrene has seasonality. PAHs in air, including 1-nitropyrene tend to be much higher between November and February in California. And this is in part because of inversions, which increase concentrations of

all winter-time pollutants.

But it's also important to note that rain leads to sharp declines in concentrations, so you can have a lot of within-season variability. Because of weather patterns, both the timing and the level of peak concentrations can vary from year to year and from place to place.

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DR. MANN: So here's what happens when we look at each of the metabolites by month of study. The red diamonds are 6-OHNP, the blue squares are 8-OHNP, and the months of CARE-LA sample collection were February, March, April, and May. And you can see there's a general decline in 6-OHNP over the months of study with highest values in February and lowest in May. And in particular, the May concentrations were much lower than the other months, but you don't see that for 8-OHNP, where the concentrations are pretty similar over the months of study.

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DR. MANN: Why is this important?

Well, here's what happens when we look at who participated by month of study, by race/ethnicity. The blue bar is Hispanics and you can see that the percent of Hispanics goes up with each month of study from February to May. This -- it's a little bit faded, but I will call

it a red-orange bar. It's right next to the blue bar is white participants. And you can see that their percent of white participants declines over the course of the study.

So this is an illustration of why differences by months could obscure any differences in 6-OHNP by race/ethnicity, given the trends in each. Similarly, the other differences by groups, such as age and income, could be obscured by unintentional trends in demographics over the study period.

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DR. MANN: This was mentioned by Robin, but we had a couple of different stages in building our models for each of our -- the analytes that we looked at in CARE-LA And the first step was to look at demographics, such as race, gender, and age, and to consider in multivariable models each characteristic that had an association with a P value of less than 0.10. And then we also considered other factors, but more specific to diesel in multiple regression models.

So we looked at self-reported exposures to diesel exhaust over the last three days, diesel traffic within 500 meters of residence and tobacco use. And I'll also point out that we, as I mentioned earlier, used log-transformed metabolites.

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DR. MANN: So on this slide, you can see what happened. NS means there was a non-significant association. And, yes, with a red star means there was a significant association. So race, ethnicity, gender, education, income, place of birth, and language of survey were not associated with either metabolite. The only thing that was associated with 6-OHNP is not really a participant characteristic, it was month of sample collection, which we put into the model because of the seasonality that we'd observed in descriptive analyses.

And for 8-OHNP age in years was associated with -- age and years was the only thing associated with 8-OHNP levels. That was associated with decline levels of about one percent per increase in age.

The same association was seen when we looked at age by categories. We had both 20-year age groups and 10-year age groups, pretty similar finding.

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DR. MANN: Hold it closer or a little further?

MS. HOOVER: Closer.

DR. MANN: Closer. Sorry.

Okay. So next, we looked at traffic near participant residents. This entire analysis could not have been completed without the EBDEP collaboration. They were the ones that came up with the sources of traffic

data and also helped us link everything in GIS. And a special thanks to Russ Bartlett for his continued assistance in this effort. He came to Richmond many times to help us out.

So, first, we started by looking at traffic counts for segments of primary highways and secondary roads for L.A. County in 2017. And the source of this data was the U.S. Department of Transportation Federal Highway Administration Highway Performance Monitoring System.

So we determined all traffic segments within a 500-meter buffer of the participant's residence. We multiplied daily traffic counts by road segment length in kilometers to get daily vehicle kilometers traveled or VKT for each road segment. And then we summed all the road segment daily VKTs to yield a total daily vehicle kilometers traveled within the 500-meter buffer for each participant.

And we looked at the traffic count data actually looked separate at all vehicles, so that's all commercial and passenger vehicles on the road. Then there's a separate category for buses and commercial trucks that don't have trailers. And then a final category for those tractor trailers, which includes those really huge semi-trucks. These latter two categories are where we

expect most of the diesel exposure to be.

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DR. MANN: So here we see what happened when we looked at these things. In the case of 6-OHNP, we also had a month of sample collection in the model. In the case of 8-OHNP, we also -- we had age, which we don't see here. And we look at all of these different traffic measures one at a time. And what you're looking at is the effect of an interquartile range change in VKT, which is a little bit of a brain twister. But what we're trying to do is be able to compare across different measures. The numbers were very different.

And we can see that for 6-OHNP, all three different measures. There's a significant association with levels of 6-OHNP. However for 8-OHNP, we don't see any association with buses and commercial trucks, and only marginally significant associations with tractor trailers and all vehicles.

And I don't want you to focus too much on magnitude of association, because I'll be presenting multivariable models later on. But you can see that the effect levels were generally higher for 6-OHNP.

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DR. MANN: Robin mentioned that we have a study -- sorry, a survey that we give at the point of

sample collection that talks about very recent exposures. And there were three questions related to diesel exhaust on that questionnaire.

And they were:

In the last three days have you worked with or around diesel-powered equipment or vehicles? That was yes or no.

In the last three days, how much time have you spent in a vehicle on a freeway? And the categories were less than one hour, one to six hours, six to nine hours, and more than nine hours.

And finally, in the last three days, have you been around diesel-powered equipment or vehicles other than for your job or on the freeway? That was a yes and no -- or no, with a follow-up as to what the exposure was. And often, it was things like having house near a bus stop or living near a busy road.

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DR. MANN: Oh, sorry. So we see some interesting results here. So work with or around diesel equipment was associated with elevations in 6-OHNP. However, time spent on freeway was associated with a decline in 6-OHNP. So for every category, there was a 20 percent change -- a 20 percent decline in 6-OHNP level which is not what you would think if time spent on the freeway was reflecting

diesel exposure.

Similarly, for 8-OHNP, there were no -- no -- there were only -- there's only one marginally significant result and that was for this other category for diesel exhaust exposures that were not at work or on the freeway. And that was associated with a 34 percent decline in 8-OHNP at a marginally significant level.

You'll also notice on this slide that what's happening with 6-OHNP and what's happening with 8-OHNP is different.

Sorry.

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DR. MANN: Keep reminding me to keep the microphone close to my mouth.

(Laughter.)

DR. MANN: So here's what happened when we looked at metabolite levels by tobacco use. This is a descriptive slide. We defined tobacco use as current -- being a current cigarette smoker or reporting current use of tobacco products other than cigarettes. There was some overlap between the two categories. We had about 20 people that fit this definition for 6-OHNP and 25 for 8-OHNP. So you can see that tobacco use increased metabolite levels for both metabolites.

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DR. MANN: The next two slides I'm going to be looking at multivariable models with all of the different variables that I've discussed. So for 6-OHNP what you don't see is that we had a factor term for month of sample collection as well, which I haven't listed. And both tractor-trailer traffic, which is the measure of traffic I selected to use for these analyses, and current tobacco use were significantly associated with increased 6-OHNP. And the other variables were marginally significant. So that work-related diesel exposure variable becomes below 0.05, but still pretty well maintained, and that inverse association with time on freeway is still there.

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DR. MANN: For 8-OHNP, you can see that age, tractor-trailer traffic and current tobacco use were significantly associated with increased 8-OHNP levels. And that the other diesel exposure, not on freeway or at work, is marginally significant.

The -- for both of these models, the R-squared is very low. It was 20 -- about 22 percent for 6-OHNP and then this model is 12 percent of the variability in 8-OHNP.

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DR. MANN: So preliminary conclusions are that month of sample collection for 6-OHNP and age for 8-OHNP

were the only participant characteristics associated with metabolite levels. And in both multivariable models, both 6-OHNP and 8-OHNP levels were associated with tractor-trailer traffic volume and tobacco use.

And finally, reported recent exposure to diesel was marginally associated with metabolite levels, but the direction of the effect varied.

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DR. MANN: So some issues came up and we were analyzing these data. And you can see that there's some conundrums in there. And the first is -- because I have a background in air pollution epidemiology, and seasonality is one of the main things that you have to confront when you're looking at air pollutants, because they vary by month. And in the case of CARE-LA, we're only measuring everybody one time. It's a cross-sectional study.

And the characteristics of participants can vary by month of sample collection. So seasonality of the air pollutants might obscure groups with higher levels of exposure. We don't see any associations, so we don't know if it's because they don't exist or because we can't see if they exist.

Another thing that came up for me was whether or not we should restrict analysis of 1-nitropyrene to non-smokers since tobacco users have higher levels of both

metabolites. And these associations with tobacco use are independent of recent diesel exposures and traffic volume.

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DR. MANN: And one other thing that's not actually on this slide that came up for me is the very different sort of pattern of what we see for 6-OHNP and 8-OHNP.

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DR. MANN: So next steps are to continue with the traffic analysis. We want to look at heavy-duty traffic, which is the combination of both the buses and commercial traffic and the tractor-trailer traffic. We also want to consider other buffer sizes around the residence, and look at the effects of bus stops and bottlenecks, all data that we're getting from EBDEP. We want to compare our results to what EBDEP found. And we now have 160 samples for 1-nitropyrene that are being analyzed with the University of Washington for CARE-2. So we'll look at that next.

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DR. MANN: I want to thank the University of Washington, especially Chris Simpson and Mike Paulsen; the EBDEP team, both at UC Berkeley and OEHHA; and the other Biomonitoring California staff.

Thank you.

CHAIRPERSON SCHWARZMAN: Thank you so much both

to Robin and to Jennifer. And - excuse me - we have time now for clarifying questions for both of them from both CARE-LA presentations, if you wouldn't mind being available also, Robin. And I will get us started and maybe I'll start with Jennifer and then go to Robin, since Jennifer just presented.

Thank you for mentioning the heavy-duty diesel vehicle category. And I'm so glad that you're going to combine those and look at that together, because from a policy perspective, that's where all of CARB's action has been.

DR. MANN: Um-hmm.

CHAIRPERSON SCHWARZMAN: And I'm separately working on an analysis of the -- which sectors are -- contribute the most to the declines in diesel emissions per vehicle mile traveled over the last 15 years -- more than that, 25 years of California data. So I think comparing those two will be very interesting.

I'm curious if you compared with NHANES, because one 1-NP is in NHANES.

DR. MANN: It's not.

CHAIRPERSON SCHWARZMAN: There's some NHANES -- I'm thinking of a different data source. Let me check what I'm saying.

Okay. Never mind that question.

(Laughter.)

DR. MANN: Yeah, we would have. We would have if we had known

CHAIRPERSON SCHWARZMAN: Yeah.

DR. MANN: And maybe Chris Simpson.

DR. SIMPSON: Yes. Chris Simpson, University of Washington. I was just going to confirm that the 1-NP metabolites themselves, to my knowledge, are not in NHANES.

CHAIRPERSON SCHWARZMAN: And my question for Robin, if you don't mind, is on your slide 17 and 18, I don't know if we could go back to those. There was one thing that you said that just went by me too fast and I didn't catch. On slide 17, you have the phenol results for CARE-LA And bisphenol A is not on there, because it was below limit of detection. But you said which -- what percent of samples it was detected in compared to BPS and I missed the BPA percent.

MS. CHRISTENSEN: Ah. Okay. Easy. Forty-seven percent.

CHAIRPERSON SCHWARZMAN: Thank you. That's very useful. And my other question was again just a small detail. Slide 18 says that the comparison with NHANES was with sample year 2013-14, but the table on the previous slide says 15-16. Do you know which it was?

MS. CHRISTENSEN: Can you hop back.

So this is -- stay here.

(Laughter.)

MS. CHRISTENSEN: No.

(Laughter.)

MS. CHRISTENSEN: Please stay here.

MR. BARTLETT: Sure.

MS. CHRISTENSEN: Thank you.

Okay. I can't explain that. And I did not make these slides. I will turn to Adam who was responsible for much of the phenols and ask him if he has an explanation here.

MR. D'AMICO: Hi. Adam D'Amico, CDPH.

Yes, the comparison was to 2015-16. We did it a couple of different ways, so I think different versions ended up in the slides, but the main comparison was 15-16.

CHAIRPERSON SCHWARZMAN: Thank you so much.

MS. CHRISTENSEN: And, yes, we compared to just the women within NHANES. So that's a further clarification, that would -- because the environmental phenols was only sampling women.

CHAIRPERSON SCHWARZMAN: Okay. Thank you for allowing my small clarifications.

Other questions?

PANEL MEMBER QUINTANA: Hi. Is this on?

I had some clarifying questions also. One is for both of you really, which is that you stated in both presentations you asked about smoking status, but did you also ask about exposure to secondhand smoke?

DR. MANN: Yes, we did. We asked about exposure to secondhand smoke both usually and also in the past seven days. The problem was that there was a big overlap between people who smoked themselves and people who were exposed to secondhand smoke. So we couldn't really look at it separately. And actually, when I looked at it anyway, it was not -- it was hard to tell what was going on. The associations became non-significant, but we had that problem.

So there's only four people in my analysis that was with the passive smoke, but themselves were not smokers.

PANEL MEMBER QUINTANA: I see. So that would be a little lower than typical for the population, but I'm sure it can happen. Another question I had was also for you, if you looked at secondhand smoke, but with your sample size, not you -- in the first presentation, because if that was looked at for cadmium. It's a known source of cadmium in the blood.

DR. MANN: It was, yes.

PANEL MEMBER QUINTAN: Okay.

DR. MANN: It's just not reported in these results, because we're reporting from an earlier phase of analysis. But, yes, we did look at cigarette smoke. And actually I think it was considered for all the metals, but especially cadmium and we did see associations as one would expect.

PANEL MEMBER QUINTANA: For secondhand smoke or for cigarette smoke?

DR. MANN: Oh, sorry. I'm not sure if secondhand smoke was looked at. Yeah.

PANEL MEMBER QUINTANA: That is --

DR. MANN: We will make sure to do that.

PANEL MEMBER QUINTANA: -- associates it.

And can I ask a couple more?

CHAIRPERSON SCHWARZMAN: Sure.

PANEL MEMBER QUINTANA: Sorry.

So this is also a general one just from we go out in the community and do some community-based studies, we find mixed race to be one of the major categories in studies. But in this CARE study, you know, I never see that as a category. And I'm wondering do you actively exclude people that are mixed race, because that would be not really reflecting the population or how do -- how does that work with your data as you show it?

DR. MANN: We don't exclude mixed race. And we

have a few different ways of assessing whether or not one is mixed race. And we have variables that specifically look at that that are part of our analysis. In -- for 1-nitropyrene, our levels -- our number of people in that category got too low as we categorized them to really look at it well. But it is something we looked at for all the other analytes. We just haven't reported it out today.

And then Kathleen, I didn't know if you had anything to add to that?

No.

PANEL MEMBER QUINTANA: So I guess I would argue against presenting the results --

DR. MANN: Without that.

PANEL MEMBER QUINTANA: -- without that, because it doesn't seem to reflect what you normally see for California.

DR. MANN: Right. So there's a few different ways that we categorized race and ethnicity. And what I was presenting today was what we call a semi-exclusive form of it. So everybody got assigned to a single category, and that included if you were Hispanic at all, you ended up in the Hispanic category. And then there was Black, Asian, White, and then other, which included mixed race people, and also people who were Native American and Pacific Islanders.

But we also had other ways of looking specifically at people who were mixed race, either non-Hispanic in two or more races or Hispanic as one of the potential definitions of being multiracial.

So we did look at that. Those results aren't here today, but we'll make sure that they are presented when we present our results. Create a category

DR. ATTFIELD: I just want to add a little context.

THE COURT REPORTER: Can you identify?

DR. ATTFIELD: Sorry?

THE COURT REPORTER: Can you identify.

DR. ATTFIELD: Oh, sorry. Kathleen Attfield, Biomonitoring California.

Just to add a little context, there are -- there are new laws around reporting health statistics by different types of categorization of multi-race. And that kicks in next year, so you'll be seeing that we have been working on looking at those in sort of different permutations for people who identify as any particular race, and then exclusively a particular race. These are all part of the requirements, and then multiracial of different sort of groupings. So you'll be seeing much more complex types of presentations by next year I think is when we're required to do it that way.

But we have been looking at these in different -- different ways because grouping people puts, you know, different ways of their types of cultural backgrounds, their exposures in different light. So it can be very illuminating and that -- you know, we'll see more of that going forward.

PANEL MEMBER QUINTANA: And one quick --

CHAIRPERSON SCHWARZMAN: Yeah, go ahead.

PANEL MEMBER QUINTANA: -- question about diet. Sorry. For the first presentation, you talked about arsenic and cadmium being higher in Asian -- classified here as Asian group. And since there's constant reports in the news media with rice contaminated with cadmium and rice contaminated with inorganic arsenic, I'm just curious if your dietary intake survey includes such detail or is it more general?

MS. CHRISTENSEN: We do collect information on rice and rice products. It is not as in-depth as the survey was for the ACE study, which really had a dedicated focus, but we are trying to capture that. And we have several food frequency tables in which we're capturing that sort of information.

CHAIRPERSON SCHWARZMAN: Other questions from the panel?

José.

PANEL MEMBER SUÁREZ: José Suárez.

I have a question about the 1-nitropyrene -- or actually rather trying to see if we can have a little bit of a discussion of the question that you have there, whether should smokers be then included for further analyses.

And so I think -- I was looking at your slide on number 15, the metabolite levels by tobacco use.

DR. MANN: Yes.

PANEL MEMBER SUÁREZ: Perhaps we can put that up there. And that kind of suggests to me that indeed they probably -- it would be better to exclude them, given that there's such a wide range there, the 95 percent confidence interval -- yeah, that's the table right there.

DR. MANN: Right.

PANEL MEMBER SUÁREZ: -- so that the concentrations vary substantially by smoking status. And even though this is cross-sectional, this would make me think that if we were to do a lot of repeated measures also the within individual variability of these would be substantially higher among smokers than non-smokers, and that becoming an issue in itself, which will introduce just a lot of noise when you're trying to compare these other constructs.

So that would be my suggestion.

DR. MANN: Okay.

PANEL MEMBER SUÁREZ: Indeed, I think it sounds like you are thinking along those same lines.

DR. MANN: Yes.

CHAIRPERSON SCHWARZMAN: Maybe I'll flag this as an issue that we can bring up again in the discussion that we have after we hear the EBDEP study results, because it probably bears a little bit of additional conversation.

Thank you for raising it and we'll bring it up again.

Other questions?

Other questions from the Panel?

Yes.

PANEL MEMBER HOH: Just clarification that -- just following up the tobacco user, is that the smoking or other products as well?

DR. MANN: So it includes people who smoke cigarettes currently. And it also includes people who smoke -- who use hookahs, and bidis, and also people who use smokeless tobacco, because that was the form of the question. It was just a yes/no question for all of these different alternatives. So they had to be included. And that's why it's not all smokers. It's tobacco users. I may have misspoken at some point, because I think of them as smokers, but they're all tobacco users.

CHAIRPERSON SCHWARZMAN: I had the same question, so that includes smokeless other form -- like --

DR. MANN: It does, but we don't know exactly what it is that they're saying yes to. It's a long list of forms of tobacco. And unfortunately, we have the same sort of lack of clarity with the recent exposure use.

CHAIRPERSON SCHWARZMAN: So that could account for some of that very wide spread in the data.

DR. MANN: Right.

CHAIRPERSON SCHWARZMAN: Okay. Other questions from the Panel for these two speakers?

Were these questions or comments from the audience?

MS. READE: Hi. Anna Reade with the Natural Resources Defense Council.

I'm curious about PFAS, the results that you had. I noticed both for this study and then for the ACE study that Me-PFOSA seems to be at high detection levels in California. But if you look at the national testing, it's a very kind of low detection level of 20, 30 percentile. Have you looked at all -- any clue as to why?

MS. CHRISTENSEN: Thank you. I'm going to invite Kathleen to answer this.

DR. ATTFIELD: That's a question we'd like to dive into deeper, but haven't yet. But I would flag that

we have a lower detection limit than NHANES does. So that's going to probably play a large part of it.

MS. READE: Do you know what it was?

DR. ATTFIELD: I don't have that number off the top of my head. I don't know if June-Soo would.

DR. ATTFIELD: The --

(Discussion off the record.)

DR. ATTFIELD: The -- sorry. The question was do we know the, off the top of our heads, the detection limit for methyl-PFOSA. I'm not remembering the full name.

MS. READE: I just was curious if it was a big difference and it could be an explanation as to why?

DR. PARK: Yeah, it was big difference in terms of detection limit between NHANES and us. One thing -- you know the very interesting thing was we also had data we analyzed from 1967. Back then, PFOSA was kind of had a higher detection frequency even though level was not very high, but the trend switching to Me-PFOSA. So we really love to see what has happened to those two compounds. As Kathleen said, we like to seek for some answers for that, but we didn't -- we haven't had a clear answer for the trend.

MS. READE: Thank you.

CHAIRPERSON SCHWARZMAN: Robin, did you have a contribution or you're just getting the microphone.

MS. CHRISTENSEN: Just getting the mic.

CHAIRPERSON SCHWARZMAN: Okay. We are just on time. If there's no other questions, we will transition at this point. I want to introduce Asa Bradman who's going to be doing our next presentation. He's Associate Director and Co-Founder of the Center for Environmental Research and Children's Health in the UC Berkeley School of Public Health. He's an expert in exposure assessment and environmental epidemiology and leads studies of vulnerable populations exposed to a wide range of chemicals, such as pesticides, flame retardants, and air pollutants. He's a past member of our Panel here and Chair of the Scientific Guidance Panel. In 2017, he was appointed to the USDA National Organic Standards Board. And he'll be presenting initial results from the East Bay Diesel Exposure Project.

Thanks for coming, Asa.

(Thereupon an overhead presentation was presented as follows.)

DR. BRADMAN: Thank you so much for the opportunity to present to the Panel and the Biomonitoring Program, and public participants.

I will be talking about initial results from the East Bay Diesel Exposure Project, which was a study designed to look at exposure -- diesel exhaust exposure in

families here in the East Bay. There's a little bit of replication here, redundancy with some of the information that Jennifer presented. So I'm going to skip through -- or go quickly through some of the slides so we have more time for discussion

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DR. BRADMAN: Before we start -- before I start that, I want to emphasize that I'm just one of really dozens of people who worked on this project. And I want to call out, especially Rosemary Castorina and Kelsey Ranjbar who are here from our group at U.C. Berkeley, the Center for Environmental Research and Children's Health, and Sara Hoover and Duyen Kauffman, Russell Bartlett and Dan Sultana from OEHHA, which worked -- have worked really hard on this project. And then Chris Simpson and Michael Paulsen from the University of Washington, who conducted the laboratory analysis.

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DR. BRADMAN: And then also other partners who really helped with this project, Thomas Kirchstetter and his students at the Lawrence Berkeley Lab helped us with air sampling and monitoring tools. We also had a lot of support and help from Ms. Margaret Gordon and Brian Beveridge from the West Oakland Environmental Indicators Project and also a lot of help from various Biomonitoring

staff, particularly the Environmental Health Laboratory Branch. So this is really -- of all projects are very collaborative and really could not have happened without the support from all these people.

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DR. BRADMAN: So our goals were to assess exposures to diesel exhaust in impacted communities in the East Bay; to compare exposures in parent-child pairs to increase -- increase our understanding about exposure patterns, so both within the household by looking at parents and children, and then also over time and between communities.

Like, CARE-LA, we'll also be looking at predictors of diesel exhaust exposure, in particular truck traffic and other traffic metrics.

We hope to generate some data that will help evaluate the effectiveness of diesel regulations in California. And we want to engage with the community and policymakers about the study results. So we hope this will inform future discussions on diesel -- diesel regulation.

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DR. BRADMAN: In terms of locations, our attempt here was to enroll participants in the East Bay and reflect kind of a variety a diversity of potential

exposures. Our primary focus was between Oakland and Richmond, but we have a few participants north of Richmond in areas where there's likely lower emissions and exposures. In general, we followed areas along the major freeway corridors including I-80, 580, and 880. We enrolled 40 families and we'll hear more about that.

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DR. BRADMAN: Just to give a sense, the areas we chose to sample in were based on the CalEnviroScreen indicators for diesel exhaust, emission, and exposure. So this is a map of California with the darker areas showing regions and census tracts with likely higher diesel emission within those census tracts, and then by implication likely higher exposure.

You can see here the dark colors are areas of potentially higher exposure. And the lighter colors are areas of lower emission and likely exposure. One thing I want to emphasize here is that -- it's shaking here. I don't know if we had an earthquake.

If we see here that the CalEnviroScreen indicator is based on estimated emissions for one summer day in 2012. So just to understand that, one, that was seven years ago, and two, that we may see seasonal or other kinds of variations in exposure.

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DR. BRADMAN: To drill down on that a little farther, I just want to give you a sense of how our areas played out in terms of likely exposure. You'll see here, this is now -- if we look here, this is the -- it's not me. It's only happening on one side.

MR. BARTLETT: It's the machine.

DR. BRADMAN: Okay. Maybe I'll point to this one.

(Laughter.)

DR. BRADMAN: You'll see that we had a median emission of about 33 kilograms per day within the census tract that participants resided in, and that there was a big range, as low as three and up to 76. And we looked at our interquartile range, there's about a factor of two difference here. So I think we were successful in sampling participants from census tracts, where there's a wide range of diesel indicators based on CalEnviroScreen. And we'll be looking at that more carefully in terms of exposure.

To drill down just a little bit farther, you can see here in the north we tend to have lower ranges of emissions and likely exposure. Here, we see three to 15 for El Sobrante, up to 18 for Pinole kilograms per day. Whereas, when we look at West Oakland, for example, we have 76, so much higher estimated emissions, and we

presume potentially likely exposure in those arenas.

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DR. BRADMAN: I'm not going to spend too much time on this slide. Just like the other slide, we -- the other -- like the CARE-LA study, we also measured 6- and 8-hydroxy-1-nitropyrene metabolites in urine. And we also took some measurements in air and dust. So we'll talk -- we'll talk more about that in a minute.

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DR. BRADMAN: So study design. We enrolled 40 child-parent pairs. The children range from ages two to ten years. So I want to note that this is one of the first Biomonitoring California studies that enrolled young children for biomonitoring purposes. We collected urine, indoor air, and also dust samples from participants.

We had two sampling rounds about four to six months apart, so we're able to look at repeat measures. And, you know, we'll have a little more power there statistically by having kind of longitudinal information.

Twenty-five of the families gave one sample for the adult and child in each family at two time points. For a subset of 15 families, we collected daily urine samples for four days, so -- at each round of sampling. So that is, I think, another interesting component of the study that we'll actually be able to look at within and

between subject variability. The field work was conducted between January 2018 and early 2019.

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DR. BRADMAN: Information collected included an exposure questionnaire, time activity information. We did a home inspection. We used GPS loggers to record -- to track where people spent time away from home for child and also actually the adults too.

We left that out there.

We measured the urinary metabolites. We've also talked about, and again, we measured these substances in the parent compound in indoor air and dust. And we also piloted the Lawrence Berkeley Laboratory instrument that allows monitoring of black carbon. A much lower cost than some of the other micro-aethalometers and tools out there. So we also have some black carbon information.

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DR. BRADMAN: In terms of our timeline, give you a sense of where we've been and where we are. We completed sampling in 2019 and shipped all those out to the University of Washington. We spent -- we received some preliminary data in the spring and summer and began working with that. We also developed results return materials and we've gone through our approval process by our IRBs. And we've actually returned all the results to

participants -- individual participants. So that phase is over and importantly sets the stage now for us doing -- planning community meetings and bringing this to the larger East Bay community.

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DR. BRADMAN: So in terms of analyses on data I'm going to present today, we're not quite as far along as the CARE-LA study, but we have some interesting information. So we'll be putting -- presenting information on demographics and selected exposure characteristics in our population, descriptive information about 1-nitropyrene metabolites summary, and also differences between children and parents within and between subject variability and changes over time. And we've also looked at a few potential demographic determinants, including income and race and ethnicity. And then some information on the indoor air and dust measurements. And we'll be giving a deeper dive in the preview of what we're doing with quite complex GIS analyses to inform our studies.

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DR. BRADMAN: So demographically, in terms of the parents, mostly mothers participated. Ninety-five percent of the adults were women. Only five percent were men. If we look at the ethnic breakdown, about -- we had a pretty

good diversity here with about 20 percent African-American, 40 percent Hispanic/Latino and about 35 percent Caucasian, and smaller percentages for Asian, Native American, or Pacific-Islander.

I want to emphasize here this does not add up to a -- it adds up to more than 100 percent. For individuals who self-identified in two categories, we just listed both here, but we'll be thinking more about that for our analyses. The average age of the parents around 36 years.

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DR. BRADMAN: In terms of education, fairly well educated group that ultimately participated. Sixty percent with college or graduate degree, 80 percent with some college or a college graduate degree, and 20 percent with a high school or diploma. About 20 percent of participants had income 0 to 25,000; 40 percent 25 to 75 thousand; another 40 percent over 75,000.

I think this income distribution reflects the education demographics in the population that ultimately participated.

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DR. BRADMAN: For children, we had better gender balance, about half and half, girls and boys. Ethnicity breakdown is similar. Although, in some cases parents identified ethnicity for their children differently,

depending on the ethnicity or race of their partner. So again, this adds up to more than 100 percent, but -- and again, people often listed more than one category for their children.

Most of the children were two to five years old, about 80 percent. And then we had a few children -- older children up to ten years within an average age of about four and a half. So we were successful in getting relatively young children for this project.

In terms of potential exposure characteristics that we'll be looking at in the future, parents, about little less than half, reported working at home. So we're spending less time away from home. About a little bit more than half reported working outside of the home. So again, it will be important for us when we look at exposure determinants to consider the different locations that they're spending time at.

About 30 percent reported some work with or around diesel equipment or diesel sources. We'll be looking at that in more detail. And among the children, about 70 percent reported spending time in school or child care. So again, it will be important for us to look at potential exposure determinants for those locations. We had very few participants reporting smoking at home, only three percent. So I think that's going to be less of an

issue for us in our analyses --

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DR. BRADMAN: -- which I think is good news that for families with children we had very few smokers.

I'll just go through this very briefly. We're going to be using the same units and the same specific gravity adjustment parameters that was reported for CARE-LA So we'll skip this slide to save some time.

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DR. BRADMAN: So here's some descriptive information for the 1-nitropyrene urinary metabolites. And some of the things that kind of I want to highlight here. One is we have, you know, very high detection frequencies. So this is a substance that's quite common among our participants.

Another point here, if you look at either our medians or geometric means, they're actually -- in particular, start with the adults, there's -- they're substantially higher than we saw in the CARE-LA population. I think the median or geometric mean was around 120 there. We're seeing, you know, levels over 200 for 6 metabolite and 160 for the 8 metabolite. The children also were higher than the CARE-LA adults. So I think that's an interesting distinction here. In this population, it may reflect potentially higher exposures.

Another point here is that you'll see that 6 tends to be higher than 8, and that the parents tend to be higher than children. And up in the upper range, you know, we see some -- some participants with relatively high exposures.

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DR. BRADMAN: This is a visual image of the adult compared to children. And again, you can see here that based on the boxplots, particularly for the 6 metabolite, parents tend to be higher in children. Although, there's substantial overlap in the distributions. And for 8-OHNP we tend to see less -- less difference.

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DR. BRADMAN: So we also looked at the internal correlation of the 6 and 8 metabolites, both within the children and adults and also between the children and adults. And we also find, you know, high correlations between the 6 -- the 8 metabolites and the 6 metabolites in both groups. We did look at this by ethnicity and did not see major differences based on Caucasian, or White, or other category. So that's something we'll need to look at more carefully.

And if we look at the relationship between adults and child, we have some statistically significant results, because we have relatively high numbers here, but the

actual correlations were relatively weak, so not apparently a big connection between what's going on in the parents and adults.

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DR. BRADMAN: This slide summarizes within and between subject variability. I think this is really important information that we should have on all urinary biomarkers. So I'm going to try to walk everyone through this slide. Sometimes this can be a little confusing.

I'm going to start with what we call the interclass correlation coefficient. So that's a measure of correlation and agreement between samples collected over time. And these have an ICC is a little bit under four. If they were perfectly correlated and similar, it would be close to one. So this shows that over a short time there's relatively high variability and they're not well correlated over a short time.

This is a little bit better than what we see say for DAPs, the dialkyl phosphate metabolites, from pesticides. So high variability here. And if we look at the proportion of variance within each group that we can attribute it to between or within subject variability, we see that within subject variability is higher than between subject variability.

So those epidemiologists here, just a reminder,

that single measurements of urine samples are not going to characterize long-term exposure. And these numbers are consistent with the urinary biomarker with a half-life of 12 to 15 hours, which I think has been reported for 1-nitropyrene. Just a reminder another highly variable urinary biomarker.

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DR. BRADMAN: This graph shows levels for adults of the two metabolites, the 6 and 8 metabolites over time. A couple things that I think we see here. One, they tend to track each other in terms of direction over time. We see somewhat higher levels during this winter sampling period. And that may be in part due, for example, we heard about the potential for winter inversions, where we often see higher pollutants. Then, of course, as we look at this in more detail, there may be periods when we have rain or other events, you know, during the winter that may clear out the air. So that's something we'll be looking at it in more detail in our statistical analysis.

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DR. BRADMAN: If we looked at the children, we find kind of a similar trend, at least somewhat higher levels also in this later winter period, a little bit less variability and also generally lower levels. So these now will be something we hope to look at in more detail.

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DR. BRADMAN: When we look at the relationship of the metabolite levels into -- in relation to some demographic variables, we don't see anything significant in terms of ethnicity. Although, and this I'm a little surprised at, we tend to see higher levels among parents who had higher income. And that is something we're going to have to look at more carefully.

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DR. BRADMAN: In terms of the children, we don't see any, you know, patterns really in any direction in terms of levels with respect to ethnicity or family income.

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DR. BRADMAN: So this is really new information. I don't think anyone has yet published information on 1-nitropyrene in dust. Here, we have levels in air and levels in dust. Some of the things that kind of jump out, or at least to me they jump out, and are exciting about this data is that, one, we detected these materials, and Dr. Simpson was able to really pioneer methods to measure 1-nitropyrene in dust. We have relatively high detection frequencies of 1-nitropyrene in the indoor environment, about 80 percent detection in air, and about almost 100 percent detection in dust.

So that underscores that the indoor environment is going to be an important pathway for exposures. And may be material, and dust, or other surfaces can be -- could be another source of exposure, pathway of exposure, we have to think about when we're also looking at inhalation or air or other predictors. And they were actually moderately correlated, 0.46, and they were statistically significant. So their appears to be some relation to what's in the air and what's in the dust.

So there might be an issue here also kind of like thirdhand smoke exposures where residues from diesel exhaust get it on the surfaces in indoor environments.

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DR. BRADMAN: So to drill down a little bit on some of the GIS analyses we'll be doing. This reflects -- I'm not expecting everyone to read all these data sources and memorize them. But the point here is that we'll be using a lot of different GIS-based information that can give us ideas about what may be important particulars of exposure.

So we have the Highway Performance Monitoring System that Jennifer Mann talked about. We'll have information on bus stops, truck networks, railway crossings, we'll be looking at railway lines, port information. So just to underscore there's a lot of

information that will be going into these analyses.

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DR. BRADMAN: And just to kind of highlight some of these, that just popped out in bold there, Russ Bartlett spent a lot of time mapping this to kind of give an indication of the -- really variability in potential sources that we'll be looking at in our analyses. You'll see here that the bright red lines are the major freeways, 880 and 580. Of course, 580 also has relatively less truck traffic because of local regulations.

You see these brown spider webs here, those are kind of the major secondary roads that we're able to map and look at traffic in relation to our residents. And then you'll see lots of little green diamonds. And those represent BAAQMD permitted emission sources. And that's something we're going to be spending time trying to understand how those point sources or stationary sources may contribute to exposure. It could be a gas station. It could be a truck stop, where there's a gas station but a lot of trucks going through them. They can also be things like an auto body shop where we wouldn't expect diesel. They can also be things like a diesel generator that is being used by a retail store as backup, given our recent episodes with PG&E. And there we have a permitted diesel source, but it's probably on -- if at all, it would

be on very rarely, we hope. So that's something we need to look at more -- more carefully.

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DR. BRADMAN: Again, also with the logger data, we'll have, rather than just questionnaire information, we'll actually have time-stamped information on where people spent time outside the home and in transit.

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DR. BRADMAN: So here's an example of simulated data, not actual data. So somebody living in Richmond may be spending time on the highway getting to Oakland, going to day care, and we can look at that in terms of time on the freeway. So that should be very interesting.

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DR. BRADMAN: So just to summarize some of the challenges we're dealing with. And Jennifer Mann mentioned the -- their analyses to look at both 500 meters what they presented, but also look at other buffers. We'll be doing something similar. We'll be looking at daily count information from the U.S. Highway Performance Monitoring System. And we plan to compute the same parameters that she mentioned, daily vehicle kilometers traveled in different buffer zones, includes the 500, but also 1,000 and 2,000 meters to get -- to see if we can understand how important local land use is.

And in a way, there's going to be an exploratory analysis to define what's the optimal buffer size. I think Dan will be doing that for all vehicles, buses, and commercial trucks and also tractor-trailers.

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DR. BRADMAN: Just to give you some numbers on this and perhaps some of the challenges. I don't expect everyone to mention this, one thing to note is just how big the numbers are. You know -- can everyone hear me?

One thing that I think is just interesting here is how big some of the numbers are within a -- you know, two kilometers of the house, we have millions of kilometers traveled per day by vehicles. But just to highlight an example here with tractor-truck trailers, you'll see we had a median of about 500 when we looked at 500 meters. And that ranged from 200 to about 4,000, so about a factor of 20 there.

When we look at a bigger buffer area, we have a much bigger number, about 24 or 25 thousand. And the range there was from 19,000 to 30,000 And if we look at the ratio here, here the ratio from the 75th to 25th quartile is about 1.5. Up here, it was about 20. So just to make the point that if we make our buffers too big, we're just going to average out land use in the area and we're not going to have variability. So that's something

that we're going to be able -- have to look at much more carefully statistically.

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DR. BRADMAN: So just to summarize the GIS analysis plan, we'll be looking within each buffer traffic volume. We'll also identify rail and maritime sources, and also identify stationary sources, and look at the -- look at associations between these sources and the -- both the metabolite levels and also indicators of indoor contamination, including the air and dust measurements.

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DR. BRADMAN: Some innovative pieces of this presentation just of this study to highlight was, one, we measured the metabolites in urine again, which is new for Biomonitoring California. We have samples collected at two time points. We'll be able to leverage the strength of a longitudinal study design to look at especially time-varying variables, like impacts of weather. We collected daily samples to get information on within subject -- or within and between subject variability. And we also collected environmental samples, which I think adds strength to the information we'll get from the biomonitoring.

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DR. BRADMAN: So next steps to kind of -- I don't

want to repeat everything I just said. But again, we'll be looking at these work-related exposures, looking at predictors. We'll also consider household combustion sources as a potential confounder particularly because of these findings with smoking. Perhaps other combustion sources may be important like gas stoves, or grilling, or things likes that.

We'll be accounting for time activity pattern, time spent in transit, and in fixed locations like work and child care. And then we'll be also taking a deep dive into other factors that may influence exposure and using perhaps, for example, air quality as a surrogate of potential diesel exposure and also considering meteorological information like recent rain.

So anyway, we have a rich -- rich data set here to better understand diesel exhaust exposures to potentially inform strategies to reduce exposures.

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DR. BRADMAN: I want to thank particularly all the families for participating in addition to our partners. They really put a lot of effort into this study.

And we hopefully we'll have some time now for questions and discussion. I hope I'm on time.

CHAIRPERSON SCHWARZMAN: You are, Asa. Thank you

very much. It was an excellent presentation. And we're actually a little ahead of schedule.

DR. BRADMAN: Great.

CHAIRPERSON SCHWARZMAN: So we can resume a more leisurely discussion. So we have ten minutes now for questions, and then -- or actually, we have a little more than that, if we need it. And then we'll have an hour for discussion of all of the morning's -- the topics that came up in all of the morning's presentation. I wanted to ask -- oh, sorry, Duyen.

MS. KAUFFMAN: Sorry, I just have one. Duyen Kauffman at OEHHA. I just have one quick correction. We inadvertently left off two members of our team at EHL. So I just wanted to name Josie DeGuzman and Julian Perez who managed all of our samples, measured specific gravity, and creatinine and sent -- aliquoted and sent all the samples off to the University of Washington. So, yeah, we couldn't have done it without them.

DR. BRADMAN: Thank you, Duyen. Yeah, again, this was really a team project. I'm just the tip of the iceberg here.

(Laughter.)

CHAIRPERSON SCHWARZMAN: It's really exciting to hear about this project. And there's so many interesting things about this study design. And one thing I wanted to

ask about is one thing that you highlighted which is the within and between subject variability. And just to confirm what I think I heard you say is that with further analysis, you're going to be able to delve into that to essentially control for, or at least look at the impact of seasonal variability and specific meteorological events, like rain. Because I'd be very curious to see how much -- if you can determine how much that within-subject variability decreases if you could control for those events.

DR. BRADMAN: Exactly. I mean, you hit it right on the head there. We have, what I'm calling, kind of six variables, like the traffic metrics. You know, those are based on 217 HPMS traffic counts. And that's going to be -- that's going to be a fixed number. And I would suspect if we looked at our pilot study, for example, a few years ago from Salinas and Oakland, you know, where there's more traffic, there's more exposure.

However, there may be, you know, individual factors/events that drive, you know, short-term exposure and probably relate to our high variability, such as, you know, an abrupt change in meteorology. And we could have a situation where a storm comes in and we clean out, you know, all the pollution, so levels may go down. They -- on the weekends, perhaps, there's less exposure. You

know, we'll be looking at that. They spent a day in a park or away from home. We'll be able to look at that carefully.

One interesting thing too about considering meteorologic data, if we have an inversion, for example, you know, we have kind of a lid on our air here, and so we have a general increase in air pollutants. And maybe that's actually going to spread out. I'm curious to see if maybe when we have better air, we'll have stronger association say with proximate sources, like traffic, because they'll be getting exposed more immediately from what's around them, rather from general soup that's being kind of held down by an inversion. So I'm hoping that we can look at that more carefully.

CHAIRPERSON SCHWARZMAN: Interesting. And I wonder if it's going to help us understand when there are not repeat measurements and we're only comparing between individuals, if that will help us understand instead of concluding that everything is determined by location, if we can start using the variables that you identify as some of the biggest indicators or determinants of within individual variability, if we could apply those to then -- to studies where we're looking at between individual variability like CARE-LA and then trying to compare results from CARE-LA to another CARE region --

DR. BRADMAN: Right.

CHAIRPERSON SCHWARZMAN: -- if we can understand what variables to add in to help understand differences between regions --

DR. BRADMAN: Right.

CHAIRPERSON SCHWARZMAN: -- where we're only looking at a single measurement.

DR. BRADMAN: Yeah. I mean, I think we can inform cross-sectional analyses from a study with repeat measures. The repeat measures -- unfortunately, it also makes things a lot more complicated. But I think that we'll be able to, you know, drill down and see what -- you know, really what are the key variables and if our study design is able to reveal that. So there hasn't been that much work done yet with this biomarker.

CHAIRPERSON SCHWARZMAN: It's really promising. It's an exciting study design in that way.

Other questions from the Panel?

Jenny.

PANEL MEMBER QUINTANA: Thank you for that. There's a lot of really interesting work that you've done. I guess my first thought was there seems to be more variables that you have to look at than you have subjects unfortunately. I hope that you're going to pursue more funding to expand the number of subjects and continue this

work with a larger sample size.

DR. BRADMAN: Can I respond to that. You make a good point there. But also note that because we have the repeat samples on the subset of 15, we actually have a lot of samples. So we have, you know, over 300 samples. So even though we don't -- we have a relatively few number of families, I'm hoping that with having so many samples, and particularly over time, that may actually add statistical power that will make up for a somewhat lower population sizes.

PANEL MEMBER QUINTANA: My other comment was, it seems, just looking at the map and some of your data, that you have relatively few, what I would call, unexposed or low exposed people in your data set. And that's kind of borne out by the levels relative to the CARE-LA I think these are -- they seem to be, just on the face of it, skewing towards more highly exposed individuals. And I was wondering if you could comment on that.

DR. BRADMAN: That might be true. I mean, if you saw, we attempted to recruit participants from areas where there was at least a wide range of exposure -- potential exposure indicators from the CalEnviroScreen maps.

And if you go back to that slide, you'll see, based on CalEnviroScreen for individual census tracts that our participants resided in, there was a fairly wide range

of estimated diesel emission and potential exposure. But it's true, I mean, we've thought about this. It would be interesting to also sample, for example, in Bolinas, or Pacifica, or, you know, somewhere where there's very low traffic, and also, you know, maybe right off the ocean, so land -- other land use -- uses may not be contributing to exposure.

I mean, our focus here was the East Bay as part of the Diesel Exposure Project, given our funding and resources. But I agree, it would be interesting to get a better sense of geographic variability.

PANEL MEMBER QUINTANA: And it also seems like participants -- this is not a criticism at all, because it's tremendous what you've done. Very difficult work in getting dust samples and air samples. So it's just a comment, more that participants do seem to have slightly more education than I would expect and lower rate of secondhand smoke exposure. So I would love another study that would catch more participants in the net, I guess, in these neighborhoods.

DR. BRADMAN: I agree with that. And that -- and I'm surprised actually to see those demographics in the end. But I agree, that's something we can do some more work with. This was really a pilot study and we had limited resources. I'd like to do more outreach to

Hispanic communities and other regions in the East Bay. And then again, I think we should -- more geographic diversity.

We have the information from CARE-LA, which is still primarily an urban area. So making some comparisons to an area where we'd really expect lower exposure would be interesting.

PANEL MEMBER QUINTANA: Thank you for your great work.

DR. BRADMAN: Thanks.

CHAIRPERSON SCHWARZMAN: By contrast sort of pursuant to the discussion of excluding smokers, it's -- this almost does unintentionally. So it's interesting to see those results.

DR. BRADMAN: Right. And I think also the low smoking reflects that we had families with kids. And I think people with kids are starting -- are getting the message that smoking is not a good thing.

CHAIRPERSON SCHWARZMAN: Other questions from the Panel for Asa?

PANEL MEMBER SUÁREZ: I have one.

CHAIRPERSON SCHWARZMAN: Okay.

PANEL MEMBER SUÁREZ: I think it's a very interesting study. I think I'm really excited to hear more of what -- how the main results turned out. I had

question about -- could you just remind me methodologically, what's the half-life of the metabolites again?

DR. BRADMAN: Based on, well, the level of variability, we've seen also some information published by Dr. Simpson, it seems about 12 to 14 hours, 12 to 15 hours. So like many urinary biomarkers, many pesticides, it seems to go through fairly quickly.

PANEL MEMBER SUÁREZ: Right. Right. Right. And that makes sense with the higher within individual -- than between individual variability.

Let me see. I think also -- I mean, based with the previous presentation where there was some interesting findings or unexpected findings about, for example, time on the freeway where that was actually associated with lower levels of metabolites. I think since now you're going to be having GPS information, that could be kind of diving in a little bit deeper there to see what -- what's going on with that piece. So I think that's really exciting.

Who's -- just out of curiosity, who are you collaborating with to do those geospatial analyses?

DR. BRADMAN: Really OEHHA. Russ Bartlett here is really helping with the GIS analyses. And then we have some support for Bob Gunier who's in our group and is an

expert on GIS analyses. And then we also have connections to Mike Jarrett and others to advise us. So we have a pretty good network with that.

PANEL MEMBER SUÁREZ: That's fantastic.

I had one more question. Let me see if I can remember it here. Oh yeah, about the size of the buffer. I think -- I think I agree with you with the size of the -- the constructs I like, so 500 meters, 1,000 meters. And then that same question about what exactly does the 2,000 meter buffer tell you? I mean, I think the main point here of these analyses would be more of thinking of the background exposures at home or close by where people are walking or hanging out, right?

DR. BRADMAN: Right.

PANEL MEMBER SUÁREZ: And then when we think about two kilometers, well, that's a good -- a good distance, right, of over a mile that you're looking at. And so it's coming back, I think, to me as to what exactly we're trying to understand with these buffers --

DR. BRADMAN: Right.

PANEL MEMBER SUÁREZ: -- and looking at the differences between the 25th and 75th percentile. Indeed, it seems like maybe looking at the other, the 500 1,000 meters that I wonder if it's worthwhile even making the buffers just a little bit smaller just for sensitivity

analyses.

DR. BRADMAN: Right. Well, I think that's something we can all consider. Yeah. We've had some discussions about that. And, I mean, as you can see, if we get too big, we're just -- kind of we have a generic background exposure, but -- so that's something that I think would be interesting to look at.

CHAIRPERSON SCHWARZMAN: Can I ask a question about related to that, are these buffer distances determined because of the way that the survey is done by the Department of Transportation?

DR. BRADMAN: No.

CHAIRPERSON SCHWARZMAN: No.

DR. BRADMAN: It basically is convention. We -- in Salinas we've done this for pesticides. In the pilot project we did on diesel exhaust for this group a few years ago, we kind of chose similar boundaries. And in different studies I've seen people go even larger. You know, I haven't seen smaller, but I think that's kind of an exploratory analysis that could inform both, you know, our findings and future study designs.

CHAIRPERSON SCHWARZMAN: I feel like I've heard about literature that has looked not at human exposure, but at like PAH deposition with distance from major roadways. Do you know how that relates to these buffers?

Because I think there's a pretty quick drop-off is my --

DR. BRADMAN: Right.

CHAIRPERSON SCHWARZMAN: -- just off the top of my head recollection.

DR. BRADMAN: Right. I mean, that would be interesting to look at.

CHAIRPERSON SCHWARZMAN: Like in less -- pretty quick, like less than 500 meters --

DR. BRADMAN: Yeah. Yeah.

CHAIRPERSON SCHWARZMAN: -- pretty significant drop-off.

DR. BRADMAN: That's something we should look at. I mean, these are particle-associated compounds. And I know like work done by Rob McConnell at USC, in general, he tends to see that over about 1,000 feet, or 300 meters, air pollution levels generally go to background levels. When you're looking at a major source like more than 1,000 feet from a freeway or 300 meters from a freeway, by the time you get about that, you know, fifth of a mile away, they air pollution levels tend to approach background versus local influence. So that actually might be an argument to look at smaller buffer areas.

CHAIRPERSON SCHWARZMAN: That's what I was thinking of that it's quite smaller than 500. And Kathy Hammond's group, I think, has some of that stuff right at

the tip of their hands.

DR. BRADMAN: Okay. Well, I'll contact her.

CHAIRPERSON SCHWARZMAN: Yeah. Yeah.

PANEL MEMBER QUINTANA: I have a question.

CHAIRPERSON SCHWARZMAN: Yes, Jenny.

PANEL MEMBER QUINTANA: Sorry. I just want to add a quick addition to that comment is that if you look at the reviews of how quickly pollutants drop off from roadways, the studies are almost all done during the day. So we do find a pretty quick drop-off within 180 meters or something for a lot of pollutants. But they have done studies showing at night, when you have these inversion layers, they tend to go a lot further when people are at home. So I think you have to take some of those studies with a grain of salt, because of this bias towards daytime studies where you have better mixing.

And then it also means that perhaps home type, and home ventilation, and home penetration might be even more important. So it looks like you have that kind of information, which is great.

DR. BRADMAN: Right. We don't actual ventilation measurements, but we do have -- I think we have the indoor air levels of 1-nitropyrene. We also have the black carbon levels. And I think that can provide an indicator of outside penetration, because theoretically black carbon

in the house is only coming from outside.

CHAIRPERSON SCHWARZMAN: And it's cool that you have the inside data because of increasingly in our region more and more people have air purifiers inside in fire season.

DR. BRADMAN: Right.

CHAIRPERSON SCHWARZMAN: But having the indoor air measurement actually, and dust measurements works with that.

You had a question or comment.

PANEL MEMBER HOH: I have a question about how you measured the indoor air and dust. Would you explain how to measure them, like the sample collection, you know, what's the timeline and --

DR. BRADMAN: Sure. So for the air samples, we collect them at the first visit. And then we looked at -- and I'm sorry, the first and second visit.

MS. HOOVER: That's dust.

DR. BRADMAN: Yeah, I'm confusing dust and air.

For the air samples, we collected them at both time periods. And when we went into the home -- we did our consent for at least the first visit and second visit. We went into the home we set up the air monitors. These air monitors are devices that were developed by Tom Kirchstetter at LBL as kind of a low-cost black carbon

monitoring system. So they have a filter and then there's an optical measure of black carbon deposition on the filter. And that's run and gives real-time data based on optical -- optical response over the three- to four-day period we had them in the home.

And then we took those filters -- the filters were filters that you might use, for example, for gravimetric methods for particulate matter. We took those filters and then shipped them to Dr. Simpson at the University of Washington. And then he met -- extracted and measured them for 1-nitropyrene.

For the dust, we simply used -- in most cases, we asked for a vacuum canister bag or if they had a bagless vacuum cleaner, we dumped the material into a bag, and then a -- and in one case I think we swept up dust. So the dust sampling collection is much less systematic. It's not like we did, you know, vacuum samples on that -- just that day or wipe samples. So it could be that somebody changed their vacuum bags six months before or, you know, two weeks before.

And that was kind of an inherent limitation in dust and air kind of some things -- some things we kind of added on with minimal resources to the study. But as you can see, we have some informative information.

CHAIRPERSON SCHWARZMAN: We have basically

reached the time where we get to open this up to a discussion of all of the morning's sessions, which are related.

And just to start people's thinking, I want to mention three things -- topics that I kind of heard come to the surface of some of the discussion already. One is the inclusion or exclusion of smokers and people exposed to passive smoke, and how including our excluding those populations affects your ability to see other variations -- sources of variations in exposures.

A second topic is the information from the EBDEP study about within individual variability and what we might learn obviously from subsequent analyses of those data that we could apply to CARE-LA data on diesel exposures.

And the third topic that's just come up is the issue of determining buffer size and that's being used within the CARE-LA study also. And I know there's a lot of cross-talk in staff between those two studies, so that all is going to happen anyway, but just as sort of a topic that's come up.

And then I also just want to say, because diesel has been prominent in the last two presentations, to remind us that there is -- for points of discussion here that we also had details and results presented on the

metals in the CARE-LA study, and PFAS, and phenols -- environmental phenols.

So all of that is fair game for discussion at this point. And I want to check in, since we've had plenty of opportunity for input from the room -- I can do then again before the end of the discussion period, but just to find out whether there's any questions or comments from the web that we should pull in now?

MS. KAUFFMAN: No.

CHAIRPERSON SCHWARZMAN: So I want to invite anybody listening to the webcast to send questions or comments to biomonitoring@oehha.ca.gov. And I'll make sure to check in before we break for lunch again about input on the web.

So anybody want to start us off in terms of the discussion of those that -- from the topics that have arisen from these three presentations.

Please.

DR. SIMPSON: Thank you. Chris Simpson, University of Washington again. I wanted to share some thoughts regarding the -- how to think about the smoking from a scientific perspective and relationship to the 1-nitropyrene. One might be concerned that perhaps cigarette smoke would be a potential source of 1-nitropyrene.

In fact, the literature really doesn't support that idea. So IARC, for example, when they did their monograph on the carcinogenicity of diesel exhaust and the nitro-PAHs, they reviewed the literature and they did not find evidence for 1-nitropyrene coming from cigarette smoke at that time. And further, they made the statement that they thought that that would be improbable, because the chemistry of cigarette smoke is reducing and 1-nitropyrene is actually a product of oxidation.

However, the enzymes involved in the metabolism of the PAHs, such as 1-nitropyrene and the PAHs in cigarette smoke, there's a lot of similarity between those enzymes. And it's quite possible that certainly chronic cigarette smoking and potentially even secondhand smoke exposure would influence the activity of those enzymes, either by upregulating or downregulating those enzymes, which would influence -- potentially influence the metabolism of the 1-nitropyrene.

So it may be that the cigarette smoke is not acting as an additional source of 1-nitropyrene, but it is affecting the individual's ability to metabolize and intersecting what we would see in that urine. So that -- that would be something for the epidemiologists to think about, in terms of how mathematically they would want to try and handle those specific possibilities.

MS. HOOVER: Hello. Sara Hoover, OEHHA.

Smoking is a really interesting question in this case. And thanks to Chris for pointing out the metabolism issue. I actually did -- as part of developing our fact sheet, I also came across the literature that indicated it was not likely a source, but I delved a little more deeply into the literature. And I'll just say a few things about what I found, because I think there's some question about that.

So there was a study that compared levels of 1-nitropyrene measured in indoor air in smoking homes and non-smoking homes. And they showed that it was higher in smoker's homes compared to non-smoker's homes and it didn't matter the type of heat or stove that the non-smokers had. It was higher in -- regardless of the type of heat, like electric heat, electric stove, gas heat, gas stove, for the smokers levels were higher. So that's a little interesting tidbit.

And actually, there's this huge encyclopedia that I came across, which is also interesting, called the *Chemical Components of Tobacco and Tobacco Smoke*. And these authors Rodgman, Perfetti, et al., they've actually spent I think their -- much of their career tracking all literature on everything every reported as a component of cigarette smoke. So I believe -- and, you know, I don't

have all the details for you, but I will certainly be developing this more. But I believe this was actually an unpublished study from U.S. EPA. And they did find in cigarette smoke condensate, they did find 1-nitropyrene.

And that I think didn't get into the published literature. Which is part of the problem of looking at the published literature, you might miss things that have been developed by people who don't get their results into the literature, which is what occurred with these authors.

The other really interesting thing that I came across and caused us to put secondhand smoke on as a potential source on our fact sheet for 1-NP is that you can form in the air. You can form 1-NP in the air. So I had the concept of, even if it wasn't in mainstream smoke, you might, in certain atmospheric conditions, form 1-nitropyrene as a result of tobacco smoking. So there's a little bit of evidence to support that, that they can certainly form in the air.

The other really odd thing that I came across, which was also really interesting, and the World Health Organization highlighted it as a potential pathway for nitro-PAHs, and they said, "Other less important pathways, which are briefly mentioned here, include endogenous formation of nitro-PAHs in the body due to reaction of PAHs ingested in food or inhaled in ambient air with

nitrogen dioxide, for example cigarette smoke".

So this has been an interesting and strange little experiment in animals, where they did show that formation in the body. So I do think it's possible that cigarette smoking or tobacco use could be an actual source of 1-nitropyrene in various ways, but the metabolism point is also well taken.

DR. BRADMAN: Also, if we're looking at hepatic metabolism versus metabolism in the lung, perhaps a smoker would have a number of induced, you know, metab -- you know, enzymes in the lung that may act more strongly on 1-nitropyrene say than if it's been ingested and come through the first pass. So maybe that's -- it could be a factor too or might explain some of the things that Chris mentioned.

CHAIRPERSON SCHWARZMAN: Jenny.

PANEL MEMBER QUINTANA: I'll just throw out another additional theory. It's possible that smokers who have a reduced ability to clear particulates, you know, by paralyzing defense mechanisms, might also get a bigger dose.

That's completely unsupported. I'm just saying that.

But I just wanted to throw out in terms of smoking that we should also be thinking in California now,

because we can now ask about marijuana smoking, which previously was a very sensitive topic. But if you're having combustion sources, kind of like to open it up to perhaps recording marijuana smoking and even E-cigarette, other -- opening up what we record in that dimension might be potentially useful.

And don't forget we also have a way to look at cotinine in the urine or other things, MNAL in urine, are interested in what kind of secondhand smoke exposure they had. This laboratory here can do it, so...

PANEL MEMBER SUÁREZ: Thank you. So I think to be able -- maybe I'll do this, so I can face -- to be able to inform the decision of whether to exclude or not smokers, I think we have to be a little more data driven in that regard. So there was some indication -- I mean, whether it is -- smoking is a source for 1-nitropyrene or whether it's alterations of the metabolism, I think the main -- I mean, from a statistical perspective, the main concern would be very high amounts of variability, and particular within individual variability kind of throwing in a range there, and to be able to do these analyses.

So at least a little bit of that was presented, kind of hinting with that. It might be good to look at other studies, and probably this has been looked at, to see how much difference there is in the variability and

perhaps start looking at some of those studies too, so we can be properly informed about whether, in fact, we should be excluding this population just for this particular type of study, in the sense understanding that the study would be small, right? If we had a lot of funding for it, then, of course, we wouldn't want to exclude some groups.

That would be my recommendation.

CHAIRPERSON SCHWARZMAN: I have a question about the occupational exposure sources that were mentioned in the CARE-LA study. And I don't remember if that was specifically collected, Asa, apart from the GIS data that will help with that.

DR. BRADMAN: Yeah. No. In our questionnaire, we asked about working near diesel equipment, work with diesel equipment, and so we have questionnaire-based information on that for our participants.

CHAIRPERSON SCHWARZMAN: My question is whether we'll be able to understand more about the sources of occupational exposure, like stationary versus mobile, ports, versus trucking, versus like toll collectors. I mean, I don't know what -- there's such different potential sources.

DR. BRADMAN: Right. I mean I -- we'll try. I think our population is -- you know, I'm not sure we'll have --

CHAIRPERSON SCHWARZMAN: Numbers.

DR. BRADMAN: -- enough, you know, representation of different occupations. But we'll certainly do what we can with our data. I mean, your mention of toll collectors, I mean, there's a real -- clearly, a vulnerable population there in terms of exposure. So there's definitely going to be some categories where there's -- there's high exposure at the port, you know, when we think of the big truck facilities in West Oakland.

CHAIRPERSON SCHWARZMAN: Jennifer, can you address the sort of granularity of this data that you have on occupational diesel exposure sources?

DR. MANN: Well, right now, it's yes/no, and it's self-reported. We also do ask about several occupations that people might have done in the past 12 months. But when I looked on that list, there wasn't any obvious ones for diesel exhaust exposure specifically. They were more limited to other analytes. That's something for us to consider.

But as I remember, when I was speaking with Duyen Kauffman, there's a lot of very specific questions in EBDEP, just not very many people.

DR. BRADMAN: Right.

DR. MANN: And same thing happens when we look at occupations in CARE-LA, and in all the CARE studies, which

is that we ask some really pertinent questions, but we might not have the power to actually look at the impacts of being -- having those occupations, just because the numbers can get really low.

CHAIRPERSON SCHWARZMAN: All right.

DR. BRADMAN: I actually had a question. So the CARE-LA was a cross-sectional study.

DR. MANN: Yes.

DR. BRADMAN: Would it be possible to get permission to -- and re-consent for say a phone questionnaire and maybe collect a little bit more granular information on diesel-related exposure?

DR. MANN: I'm handing the microphone to Robin.

(Laughter.)

MS. CHRISTENSEN: Okay. No, not technically at this time. We have considered adding something like that to our informed consent that would allow us to re-contact participants. We have the ability to reanalyze samples, but not the ability to reinterview or re-question -- or ask additional questions.

CHAIRPERSON SCHWARZMAN: So if I understood that right, you're saying that for future consents you're trying to find a way to add keeping open the possibility of recontacting participants?

MS. CHRISTENSEN: I would say it a little bit

softer. We have considered keeping that open, and we are weighing the pros and cons of doing that.

One of the issues that we are dealing with with the CARE study is, because it repeats on an annual basis, we are trying to keep each region into a very tight timeline. And it might actually be more beneficial for us to add additional questions in future regions, if we are going to be pursuing down this path -- this pathway.

CHAIRPERSON SCHWARZMAN: Yeah. June.

DR. SHE: This question may be to -- Jianwen She, Chief of Biochemistry Section at the CDPH.

This question may be for Chris or Asa. Look at the -- examine the structure of the 1-nitropyrene, 3-hydroxypyrene is a possibility, because it's in the meta position. So my question have you ever investigate 3-hydroxypyrene and compared the 6 and the 8 and what did you find?

DR. SIMPSON: So the short answer is we have not. We developed the assay that we used with Asa based on previous literature that had tried to measure all of the different nitropyrene metabolites in rat urine I believe. And the 6 and the 8 hydroxy metabolites were the ones that were the most predominant. So those were the ones that we focused on and developed in this particular assay. And I think that's due to the specificity of the enzymes that

are involved in that hydroxylation reaction.

CHAIRPERSON SCHWARZMAN: I wanted to return to the PFAS findings from the CARE-LA study. It was noted that -- I'm not looking at the right thing. Hand on one sec.

The -- it's almost across the board, the -- although the detection frequency in CARE-LA was very high, the geometric means were all -- where they differed from NHANES, they were all lower, statistically significantly lower. But in that -- in presentations of that information, it was noted that the CARE-LA data is from 2018 and the comparison NHANES data is from 2015-16.

And we know that especially for some PFASs, in particular, the levels have been declining nationwide. And I wonder is there a role, is there any possibility for looking at older NHANES data and getting a sense of nationwide what that slope is, that slope of decline --

DR. ATTFIELD: Yeah. That -- I mean -- sorry. This is Kathleen Attfield --

CHAIRPERSON SCHWARZMAN: -- to help you put it in context.

DR. ATTFIELD: -- from the Biomonitoring California staff.

So that data is readily available and in NHANES shown -- and it does show those same types of declines.

Here in California, we actually have even more regional specific information in that the California Teachers Study has done this analysis.

And if you remember in my ACE presentation, I had tried to sort of extrapolate into the future based on the California Teachers Study of how the ACE levels -- PFAS levels might compare.

So that -- that was instructive, though we do have to keep in mind that the California Teachers Study is predominantly women and they're very different sex patterns of concentrations in some of the PFAS.

CHAIRPERSON SCHWARZMAN: And I guess the only other thing would be holding on until NHANES releases subsequent study years cycle --

DR. ATTFIELD: Yeah, it's a continuing problem for us to contextualize our information, in that we are sharing faster than NHANES is. So we have to try to do a little anticipation of the national and regional trends and try to give you that grain of salt when we present.

CHAIRPERSON SCHWARZMAN: Which we appreciate the fast release. I don't mean to knock that, but just that it would be interesting to return to that comparison when there's more -- there's more comparable time period data available from NHANES.

DR. ATTFIELD: Oh, of course. Of course, we'll

continue to update those.

CHAIRPERSON SCHWARZMAN: Yeah, please.

DIRECTOR ZEISE: And I think, you know, another thing to consider is the very long half-life that we think we know in humans. So the question is can it really explain such a large difference over such a short time? So I think that's -- that would be something else to look at.

DR. ATTFIELD: Well, and I'd add there are more studies coming out where they're looking at particularly affected communities, where they have very strong interventions put in place for, you know, substituting out drinking water sources that are giving us a better idea of half-life.

CHAIRPERSON SCHWARZMAN: Yeah. And I guess that -- that difference between California and the rest of the U.S. or the U.S. as a whole, including California, I'm particularly interested in just to think of what California is doing differently that may be affecting this -- the results, exposures on a population level that if we can take out the variable of time, that -- I mean, that's one of the reasons I'm kind of pushing this topic is if we could. We know that time is an important variable in this current comparison, because it's all the information that's available.

But if we could take out that time variable by using later data when it comes out from NHANES, then it let's us -- it helps us think about what's specific about California that's making a difference.

DR. ATTFIELD: Yeah. I'd add the caution that PFAS that there's sort of general population levels of PFAS can -- levels, and then there are very exposed communities. And those have tremendously different values. And so any particular sampling, you know, may or may not include those people from those very exposed communities.

And in California, we're just beginning to understand where those very exposed communities might be. So that's going to have to play into it.

CHAIRPERSON SCHWARZMAN: Little insights into that by looking at the range, right, of sort of distribution, and range of exposures within a sample.

DR. ATTFIELD: Yeah. We do tend to focus a lot on the geometric means of course, but yes, of course --

CHAIRPERSON SCHWARZMAN: Yeah. Yeah. Yeah. It's something that we're looking at --

DR. ATTFIELD: -- we can look at the higher in terms of the range.

CHAIRPERSON SCHWARZMAN: Yeah. And now is what can we learn about looking at the particularly high

exposed and the particularly low exposed in the samples.

DIRECTOR ZEISE: No. I was -- that was exactly -- and for the CARE study, it's so large, really, in terms of numbers of people that we typically look at for these levels that -- looking at the tails of the distribution.

DR. ATTFIELD: Right. We'd like to do more with that.

DR. ZEISE: It could be informative.

PANEL MEMBER SUÁREZ: I have a question.

CHAIRPERSON SCHWARZMAN: Oh, yeah, Martha, did you something on that?

DR. SANDY: I did.

CHAIRPERSON SCHWARZMAN: Please.

DR. SANDY: Yes. Martha Sandy.

I had a question to Kathleen, I think. Do you anticipate -- so we're talking about population geometric means, and that's really valuable, but you also have the questionnaire data. Are you going to try to look at where people live or what they said on a questionnaire about the frequency of eating out and other -- of wearing stain-resistant clothes, et cetera, to look and see if you can see some differences within the population in CARE-LA for PFASs?

DR. ATTFIELD: Yeah. I had definitely started

looking at those analyses. These days, I'm very embroiled in the vaping associated pulmonary injury outbreak. And I've not had as much time on that lately. But, yes, it's definitely slated.

We do have -- yeah, complicated factors of such a strong sex association. So any sort of questionnaire items that might be more associated with sort of female gender or male gender can sometimes get swallowed up in relation to sort of cosmetic products and things that have various coatings in them related to water resistance.

PANEL MEMBER SUÁREZ: I have a question just out of curiosity actually. So I see here Et-FOSAA -- that would be with two As - I guess that would be the acetic acid version of it - what are the sources of that? Primarily because when I look at that -- I take -- I bring it back to the agricultural world, of which we're concerned about, Et-FOSA, with just one A, could be a source in one of the main components of the pesticide, which is sulfluramid. So I'm very interested in hearing about this Et-FOSAA here that you have listed.

DR. ATTFIELD: Yeah. I'm afraid we'd have to get back to you on that. I don't have that off the top of my head. Sorry.

CHAIRPERSON SCHWARZMAN: Yeah. Jenny.

PANEL MEMBER QUINTANA: Hi. I just had, I guess,

a question really to people about the new study coming out in San Diego, the new CARE study, because I believe the timeline I saw was to try to get it done pretty quickly. So it sounds like from a 1-nitropyrene point of view, you want to sample everyone at once, same day. Not going to happen. But I don't think we really discussed how to incorporate this seasonal variability into CARE or if we should.

MS. CHRISTENSEN: Well, I think that -- this is Robin Christensen. I think that we have learned a number of lessons from the first two regions of CARE. And so in terms of looking at the seasonal trends, we are trying to get out a bit earlier and end a bit earlier as well. That also helps our epidemiologists get the data in their hands a bit faster.

But more importantly, we're trying to control for other factors like recruitment throughout the study period, the disparity in race across the months, the trends in race across the months is really problematic in CARE-LA as you saw. So we're doing our best to overcome that with a different recruitment strategy.

And we believe that that has worked out better as the data have -- we haven't quite seen the data yet. But the recruitment has improved for CARE-2. And so if the data bear out, we will definitely continue that for CARE-3

as well.

Do you want to add anything, Jennifer?

DR. MANN: No. I just want to say that I think we haven't talked so much about seasonality in 1-nitropyrene, and I think we should be thinking about it, especially in the context of a cross-sectional study. And I think you've had some really good ideas about how we can learn from studies like EBDEP, and their within-person variability and how maybe we can model that.

But seasonality is probably still going to plague us, because of unintentional things that happen over the course of a study, no matter how well we try to design it, and how much we restrict the time period. We can't control the weather. We can't control all sorts of things. So it's something I think we should be thinking about as we move forward with having 1-NP as a component of our biomonitoring.

MS. CHRISTENSEN: I just want to also add that, you know, we have mentioned a number of times we have this very, very ambitious timeline. And looking forward to CARE 4, we are trying to stretch it out a little bit. So that will give us a little bit more of a bit of breathing room on -- to prepare for the study. And we're considering moving sample collection to a different time of the year, which would actually coincide better with PAH

season. So that would be one benefit of making that adjustment.

And again, let me soften that statement. We are currently still talking about doing that. I'm not making the commitment to do so at this meeting.

CHAIRPERSON SCHWARZMAN: Yes, please.

PANEL MEMBER HOH: It just came to my mind that California, especially, we have a huge fire here. So is that something also considered to the CARE? Like a sampling collection time and then the season. You know, we have a huge wildfire kind of stuff.

MS. CHRISTENSEN: We are -- we are very aware and growing more aware of the fire season and the increasing length of the fire season. I think I saw a headline recently that said it might continue into December for the Bay Area now.

So working around fire season is actually becoming more and more difficult. What we are doing is we are tracking exposure to fire -- recent exposure to fire on our questionnaire. So we are hoping to able to track that information.

CHAIRPERSON SCHWARZMAN: Asa, you referred to EBDEP as a pilot study. Can you say anything about what you're envisioning for the future?

(Laughter.)

DR. BRADMAN: Well, I think if there was funding, it would be interesting to target different geographic areas. Sorry. Can you hear me -- would be to target different geographic areas, you know, with expected low and high exposure beyond just the CalEnviroScreen indicators.

You know, for example, like I said, going to Bolinas or other -- you know, other locations, along the coast, maybe the Central Valley, maybe the mountains just to really -- to get a better sense of how local land use impacts exposure. So I think that would be a first step. Another step would be also to consider perhaps looking at health or other types of outcomes that might be related to diesel.

So, you know, I tend to think epidemiologically and both -- in terms of both exposure -- I tend to think both in terms of exposure and health. And it would be interesting to do some studies that looked at health outcomes.

CHAIRPERSON SCHWARZMAN: Would you consider not changing some things and just adding numbers to increase the pat -- like with this conversation about how many variables there are versus participants to increase the power of some of the subgroups that might be formed with trying to control for various -- other variables?

DR. BRADMAN: That's a good question. It's an interesting question, would you rather increase numbers or design, basically?

CHAIRPERSON SCHWARZMAN: Yeah.

DR. BRADMAN: I hadn't though about that. I would definitely increase numbers. Definitely. I would increase geographic variability. In terms of design, you know, I think that we'll have to be doing some data analysis and see what questions we can or cannot answer.

And that might inform how we might trim the study to make it less expensive, but -- and more feasible in a larger population or -- and then also we might identify priorities, so...

CHAIRPERSON SCHWARZMAN: I guess I was even just sort of saying holding everything the same while you're talking about adding geographic variability. But maybe also holding geographic variability the same and adding more numbers to help tease out the impact of some of the other variables --

DR. BRADMAN: Right.

CHAIRPERSON SCHWARZMAN: -- by increasing your N in the variety of pots there are.

DR. BRADMAN: Yeah. Yeah. I'll think more about it. It seems Sara had some thoughts here.

MS. HOOVER: I just wanted to respond a little

bit more to the question about why did we call EBDEP a pilot. And I'll just -- for those of you who might not have heard some of our earlier presentations on this, EBDEP arose, first, out of the Panel's strong interest in diesel for many, many years. Ten years, in fact, it's been a priority of the SGP, so we had that in our mind. And with Chris's work, we had an opportunity when we got our one-time environmental justice funding. OEHHA was given -- unexpectedly, we got $250,000 but with no position authority. So that gave us the chance to develop this study, which we did.

And then we added about 100,000 extra dollars from salary savings from vacant positions to be able to do the complementary studies. Now, that's still actually a really small study, so that's partly why we're calling it a pilot. We're also partly calling it a pilot, because it's the first time we undertook measuring 1-NP. So it was still -- even though we had evidence of -- and it's not -- it's not a specific biomarker. It's -- as Chris has talked about in the past, if there's a source of diesel exposure, it's likely that that's the source of 1-NP.

So, you know, we're just learning more about the use of this biomarker. And I do think this is actually a great set-up for the discussion this afternoon, where

you're going to hear about plans for AB 617 studies, which are also small studies, and this question that you're all thinking about, about do we add more power, do we add more participants, do we go back to the East Bay, or do we go somewhere else in California?

So this is actually a really essential question, and that's partly -- we're going to be delving a lot more into that. And I would encourage all of you to think very carefully about that.

And then also the issues that Jennifer has raised about -- so we were happy that -- so CARE-LA also -- that was an add-on. Nerissa had an opportunity to have additional funding that could support the analyses of 1-NP. So it was an add-on. It was not a -- part of the design of CARE-LA And I think CARE-2 actually is the same thing. It was really an add-on to CARE-2.

So it's really valuable, but also challenging, you know, to understand that data, because of the nature of the data. So just a few comments on that.

Also, related to wildfires, I wanted to preview another complementary study that we funded. We were able to collaborate with Betsey Noth at UC Berkeley to do some biomonitoring -- not -- sorry, air monitoring of PAHs in Richmond. And we did that because part of the design, the original design of EBDEP, was to -- we're very well aware

of the seasonality of air pollutants, and so we wanted to recruit in two distinct seasons. We wanted to be in the more significant winter air pollutant season, and then the lower expected levels in summer, and it just -- it was not possible to do that for a whole bunch of reasons.

But a lot of it was hinging on the effort involved in recruitment for that study. It was much more difficult than we anticipated to recruit parent-child pairs in our targeted areas. And, Duyen was pounding the pavement quite a bit to get volunteers for this study. And it was really a year-long process. So we -- our study was kind of continuous sampling over a year, instead of two distinct seasons. So that was another big challenge.

So it was great that we could go twice, but we don't have nice distinct seasonal pools, which also complicates that. So that was in the design, but we couldn't achieve that design. So that's another thing to think about going forward.

And also just the -- I mean, truthfully this -- signing up for this study was a huge ask, you know, in terms of what we had the families doing, in terms of, you know, daily collection of samples from themselves and their children for the subset. Air monitor, you know, vacuum bag, activity diary every single day, carrying a logger around with them. I mean, it was -- it was a big

ask. So again, a huge thanks to our participants for taking this on.

It's not something that we would be likely to repeat anytime soon, because of the challenges we faced in pulling this off. So we would probably favor a simpler design, you know, aimed at answering specific questions. So that's another thing that you guys could think about, about what would be good for that.

So I segued off the Betsey Noth. I just want to get back to that. Because of that incredible difficulty in when we measured, and we measured in different areas of the Bay Area at different seasons, so we wanted to go back to Richmond and collect some air monitoring data during the seasons that should be more heavily impacted to try to get more context on our Richmond results. And she actually did measure during the fire and she did see an indicator, which is retene. Retene is known to be associated with wood smoke and she could pick that up in her data. So we're going to be, you know, reporting back on that data. So that was very interesting.

And also Marley, in my group, has been looking at anyone biomonitored for retene or looked at other markers that could pick up more -- you know, not -- I mean, specifically, right, PAHs are hard to be specific to a source. But things that tend to be more associated with

one source or another, we're looking into that as well.

CHAIRPERSON SCHWARZMAN: Yeah, Jianwen.

DR. SHE: Jianwen She again.

Regarding, the weathering effect on the monitored levels, I think at least the large PAH molecules, kind of to be bound in particles. So in the air monitoring you have vapor. You have particulate.

In the wintertime with the rain deposition particulates need to be monitored to have a full picture. If we considered to further comprehensive understanding the mass balance, I think wet rain deposition could be a component beyond the dust, and the filter, and other things. That's a comment.

CHAIRPERSON SCHWARZMAN: I have to change away from diesel again. I was struck by something that Robin presented that eight percent of the study population was above level of concern for at least one metal, and that that was consistent with the BEST study from another region from the Central Valley.

And again, because this study makes a comparison to NHANES results, is it possible to use NHANES results and see the percent above a level of concern in NHANES or do you not have that -- you have mean and you have quartile data from NHANES, but do you have --

MS. CHRISTENSEN: I am going to look at my friend

here Jennifer Mann.

DR. MANN: NHANES doesn't really work on an individual level. All of the observations are weighted and they're weighted to take care of a bunch of different issues and designs. So we won't have that.

CHAIRPERSON SCHWARZMAN: Yeah. That's what I suspected. I just was -- it's such a cool piece of information that you've generated. And I was wondering if there's a way to make context, but I suspected not.

DR. MANN: I mean, we do have the highest percentile that they report in the fourth report and that we could probably get is the 95th percentile. So we do have that.

And I suspect one could get -- I mean, I've in the past gotten individual level NHANES data. They're very restrictive about what you can ask and what you can do with it, and where you do that analysis, especially.

But I wonder if people have looked at the equivalence of levels of concern for different things in NHANES at the individual level, or at least an estimate of the percent of the population. So that's something that could be considered. It's just a lot of effort.

CHAIRPERSON SCHWARZMAN: I'm familiar with the difficulty of a restricted data center application.

MS. HOOVER: Hi. This is Sara again. I could

just add that actually many of our levels of concern came from CDC. And it came from numbers that they chose as their early -- or, you know, they don't return results. But if they're above a certain level of concern, they do.

So they might actually be able to tell us what percentage they see. I don't know if they'd be willing to, but we could certainly ask, because I would think they would have that information for a lot of our LOCs, because they -- we adopted them from CDC.

CHAIRPERSON SCHWARZMAN: That's interesting. That's good to know. It's not in the publicly available data.

MS. HOOVER: Correct.

CHAIRPERSON SCHWARZMAN: But maybe we could work with them to do that.

Other questions or comments?

Yes.

PANEL MEMBER HOH: So it was just addition to what Meg talked about PFAS, the NHANES comparison. I think it's similar things that the phenol data also that the California CARE data, the triclosan was way below the NHANES data. It might be related to the banning of triclosan in 2017, possibly, something -- I mean, something that I could think.

MS. HOOVER: Well, actually in terms of timing,

so our samples are more recent than -- yeah. So I would say, yes to that. And actually that -- I just wanted to highlight a few things that -- about the phenols. And we know it's a teeny sample, you know, not representative, 60 women. But we do see like what you just flagged that sort of trend.

I just wanted to highlight a few other things, because of your comment and Lauren's interest in regulatory effectiveness, even in that tiny sample, you're raising that issue, the other interesting thing just about detection frequency that we saw was that we saw the BPS with a very high detection frequency relative to BPA. So that's interesting. And that may actually indicate a shift.

We know that BPS is not a straight replacement for BPA, but it has been used in cash register receipts increasingly in place of BPA. The other thing, triclosan, it -- although it was banned by the FDA in 2017 in liquid hand soap and body washes, we did still actually see a relatively high detection frequency of 82 percent for triclosan. I wasn't really too surprised by that, because triclosan has many other applications beyond the use that was banned. So it's added to many housewares, like cutting boards, sporting goods, other personal care products. So it was a narrow ban. So to keep in mind

that for triclosan.

The other little interesting tidbit out of the small phenol sample was that triclocarban had a detection frequency of only 17 percent. And unlike triclosan, the ban of triclocarban by FDA actually did eliminate the major use. So what we have found based on -- what we understand to be true, based on our research, that the major use of that was in a particular type of deodorant bar soap, and that use is no longer allowed. So just a few highlights from that data.

CHAIRPERSON SCHWARZMAN: Go ahead, Nancy.

MS. BUERMEYER: Nancy Buermeyer -- excuse me -- with the Breast Cancer Prevention Partners.

Relative to the phenols, I just had a quick question. As an advocate like ten years ago, we talked about BPA being 93 percent detected in the public. And I know that BPA has gone down over time. And your data shows BPS coming up. But I just was curious what the 46 percent detected rate in California, how that specific detection rate related to the detection rate on NHANES in the most recent data, if you know that.

MS. HOOVER: Just actually none of us have that off the top of our heads, but we can follow up and look at it. The other thing to always remember is when comparing detection frequencies, the MDL, you know, the detection

limit is critical. So we -- we're not necessarily able to directly compare, because we have very low detection limits, i.e. good detection limits, where we can pick up a lot.

So we'd have to actually look. If we compare those two, we'd have to look at the relative detection limit between our study and NHANES to determine whether that comparison is actually illuminating or not.

MS. BUERMEYER: So yours would be higher?

MS. HOOVER: So -- so yeah, if we have a lower MDL compared and we see a higher detection frequency, we'd have to consider is that arising because of the difference in the MDL.

CHAIRPERSON SCHWARZMAN: Jenny.

PANEL MEMBER QUINTANA: Hi. I was just looking at the slides from this morning and I realized we haven't had any discussion about the Program budget with a very downward trend. And I think I was told that the CARE that's going to happen in San Diego still has funding. But do we have to have any discussions about tough decisions that have to be made about approaches or anything like that?

MS. CHRISTENSEN: I don't have any discussion points or talking points for any tough decisions that need to be made just yet. I feel -- I feel like this -- I feel

really conflicted about this graph. Because as I mentioned, when we talked -- when I presented my slides, we are actually -- we're in a good position relative to some other states. We still have our Biomonitoring Program. We have instrumentation. We have excellent staff. We have a budget that allows us to continue to do our primary mandate, even though we are trying to figure out how we can continue to do our primary mandate moving forward.

So we're not there yet though. We are fine for CARE-3. We are looking forward to how we can make adjustments for CARE-4. And part of that includes like causing -- putting a little bit of a buffer of time, so that we're not stretched quite as thinly.

I don't think we're at the point where we need to bring difficult decisions to the Panel just yet, but I trust that you guys will be here to offer advice for us when we're -- we are there.

Anybody else?

CHAIRPERSON SCHWARZMAN: Maybe the one thing that I would flag about that, which I so appreciate and it speaks to the ability of the Program to do so much with so few resources, is that not to lose site of the fact that we've lost -- in the CARE study, we've lost the ability to look across the state at the same time. And that's a huge

loss in light of the original intention.

And so I'm so proud of or -- and in admiration of what the Program does with the resources it has. And that it's not -- at the same time, it's not what we aspire to, if the Program had adequate resources.

MS. CHRISTENSEN: That's well put. We -- and we have never had a statewide study where we were able to do that. So that -- either we -- when we've cost out what that would look like, it is quite a bit higher than our baseline State budget. But it is actually also higher than our budget in 2016-17, when we had the extra temporary funds and the additional environmental justice funds.

So, yeah, I appreciate that. Thank you.

CHAIRPERSON SCHWARZMAN: I'm doing -- I'm not faulting the Program. It's the opposite. Just that that is what was in the original sort of statutory mandate, the reason for -- one of the reasons for being -- establishing the Program. And so it's phenomenal what the Program has been able to do in spite of funding, but just -- I don't want to lose sight of the fact that the funding has been -- I mean, the Program has been unable to accomplish the original vision, because it hasn't had the budget to do it.

MS. HOOVER: I'll just add on to answer your

question, Jenny. One -- one thing to note is that 1-NP, as I mentioned, was an add-on. That's not a core part of CARE. And that was additional funding that Nerissa and her group was able to obtain.

That's not necessarily available going forward. So that would be something to discuss about if we wanted to continue measuring 1-NP, we'd have to find the resources, if we wanted to do that in CARE. So that's something worth potentially commenting on.

PANEL MEMBER QUINTANA: Again, I'd like to echo our Chair's comments that my comments are made with great admiration for the staff. But I do want to re -- you know, reiterate that the Program has never had the full funding it needed for the initial vision for the Program. And so I still wonder if we should go towards more targeted studies rather than year-by-year studies of different regions without the ability to answer questions about statewide trends or something like that. This is a future discussion topic.

CHAIRPERSON SCHWARZMAN: I want to break to check in with the web and see if there's any comments or any other public comments. I want to make sure to have the chance to include those before we end.

And I don't want to cut off discussion prematurely, but we can -- if there -- if there are no

more comments, we could break 10 minutes ahead of schedule for lunch.

Martha.

DR. SANDY: Martha Sandy, OEHHA. Since we have a little bit of extra time, I had a question for Dr. Bradman. The results -- the preliminary results you reported on the 1-NP metabolites, you saw lower levels in children than in their parents. And I found that surprising, than -- but you haven't had a chance to really look further and try to do comparisons with dust and things like that. But do you have any thoughts of why?

DR. BRADMAN: Yeah. I actually did notice that and I think I have to caveat and say that's something we need to look at more carefully. I mean you do see with some populations that children have higher exposures than adults in the same environment that they, you know, eat, breath, and drink more per unit of body weight.

We haven't -- lower concentrations in urine may not necessarily mean lower dose on a milligram per kilogram basis. So I think that's something that we should look at and maybe even -- it might be hard, but perhaps come up with some sort of dose estimate. And it may be also that higher exposures to parents are occurring, you know, on the road, or at work, or there might be other additional sources that kind of are over

and above what the children are getting. But that is something I have thought about and will think about I think as a group as we go forward.

CHAIRPERSON SCHWARZMAN: So relate that to the diesel -- the one 1-NP findings in the CARE-LA study. If I heard correctly, Jennifer, that was -- exposures were higher with younger age and there was a one percent decrease per each year of increasing age, is that right?

DR. MANN: For 8-OHNP, yes.

CHAIRPERSON SCHWARZMAN: Okay. But not for 6-OHNP?

DR. MANN: But not for 6.

CHAIRPERSON SCHWARZMAN: And this is just another area of where the connection between the two studies is so interesting. And I wonder with further evaluation in both studies how that will bear out, because the fact of the pairs in EBDEP could be so revealing and help with the CARE-LA diesel results, the CARE-LA 1-NP results.

DR. BRADMAN: And also the -- I'm sure -- I don't remember the age range, but, you know, we have a relatively young parent population with, you know, kids that are mostly under five. So it's probably different from the age range that you had.

DR. MANN: In adults, I'm thinking, but not quite remembering. I think our median age was in the 40s, is

that right, Kathleen? I think it was somewhere in there, so they were older. And you had to be at least 18 to be in our study. And most people were above 20.

CHAIRPERSON SCHWARZMAN: Interesting.

PANEL MEMBER QUINTANA: Very short, because lunch is looming over. But I seem to notice in your data that the children had a bigger seasonal effect than the adults going from like 100 to 300, versus the adults from 200 to 300 or something.

DR. BRADMAN: I have to look at those graphs, but I don't --

PANEL MEMBER QUINTANA: We don't have to go back. I just was -- it just seemed like it could be a slightly different pattern and I thought that was interesting too to follow-up on.

DR. BRADMAN: Yeah, they seem to be more stable. But I think again, we need to look -- we're going to have to look more carefully at the seasons there. And then also, you know, again, I'm really interested to see what the approximate impacts of weather are. So I mean, for example, they're higher during that winter period. But then again, you know, I'm curious like if we're going to see like within that period, we have a change in weather, a change in, you know, air quality, that maybe that will have an impact there, so -- and that generally tracks what

we saw for adults, which seemed to be also higher levels during that winter period.

MS. HOOVER: So the other issue that we have, we haven't actually looked at the individual measurements. These are -- as we mentioned, this is averaging. So that's the other piece is actually looking more specifically.

DR. BRADMAN: Yeah. Yeah.

DIRECTOR ZEISE: It's a question for Asa. I'm just wondering and thinking about you're thinking of you, know, how would you progress out from the EBDEP study. If you thought of more proximate measures of markers of effect that were sort of much closer in terms of time frame, if you thought about what that might look like, maybe some inflammatory markers or something. Markers that could potentially be related to particulate exposure.

DR. BRADMAN: Right. I mean, those are the kinds of outcomes I've thought about. I mean, there's more, you know, concrete health outcomes, like maybe lung function or, you know, respiratory symptoms. That though is more complicated and perhaps harder to get -- well, there's more potential for variable information, I think. But that would be interesting.

And then just the kinds of things you mentioned as, you know, markers of inflammation or others. I have

to go back and think of some of the work that we've done with those markers. I'm not sure on what time scale they vary. So we'd have to think carefully with what we would select

CHAIRPERSON SCHWARZMAN: Also, are any of those available in urine? I think of those as serum markers.

DR. BRADMAN: That's true. Although, I think -- I mean, I feel like with our own research that I've done over the last couple decades, we haven't really taken advantage of what can be learned from metabolomic analyses, and that there may be, you know, markers that reflect inflammatory processes that we could focus on in relation to environmental exposures. I think that's -- you know, there's room for a number of R1s, you know, looking at those kinds of outcomes.

CHAIRPERSON SCHWARZMAN: Any final questions or comments?

Okay. With that, we will wrap-up just five minutes early for lunch. So we will reconvene promptly 2:00 o'clock for lunch. Give you just about an hour and 20 minutes for lunch. There is a handout in your packet that has suggestions of some places to eat that are within a five-minute walk of here to help you get back on time.

And just a quick reminder to the panelists to comply with the usual Bagley-Keene requirements and

refrain from discussing Panel business during lunch.

And with that, I'll adjourn the morning session and we'll reconvene at 2:00.

(Off record: 12:40 p.m.)

(Thereupon a lunch break was taken.)

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

(On record: 1:58 p.m.)

CHAIRPERSON SCHWARZMAN: I want to welcome everyone back from lunch and start the afternoon session.

So this afternoon, we're transitioning over to a discussion of the implementation of AB 617 and specifically some work that's being done in AB 617 communities. And I want to introduce our speakers for the next session. Heather Arias is Chief of the Community Planning Branch in the Office Community Air Protection at the California Air Resources Board. She'll provide an update on CARB's implementation of the Community Air Protection Program, and -- that's established under 617. And Terry Allen and Brian Moore are here. They are Air Pollution Specialists in Heather's Branch and CARB's liaison for two AB 617 communities that they'll be highlighting and discussing today.

So after their presentations, we'll have an open discussion where we want to explore next steps for biomonitoring in AB 617 communities.

Thank you.

(Thereupon an overhead presentation was presented as follows.)

MR. ARIAS: Okay. And thank you. Thank you for having us this afternoon. Again, I'm Heather Arias. I

work in the Office of Community Air Protection at California Air Resources Board. We were in front of you last year and gave you a quick update on what we were doing at the time. And so now we can give you an update on what we've been through with the first communities and where we're at for year two.

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MS. ARIAS: So just as a quick reminder, AB 617 was signed into law in 2017 and required several new actions. It required us at the California Air Resources Board to identify some new statewide actions to help communities statewide. We had to come up with an annual emissions reporting system. So there has been a reg that's been adopted to do that.

We have selected communities for monitoring and emission reductions program. We'll talk about that in a little bit. And that is an annual process. We have been providing community grants to various community-based organizations throughout the state. We are working to accelerate installation of pollution controls not only on mobile sources, but the air districts are as well on the stationary sources. And the bill gave us the ability to increase penalties for violations.

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MS. ARIAS: So as we talked a little bit about

last year, we were in front of you talking about what we were considering for selecting the 2018 communities. This is a quick summary of what were our different inputs into the analyses that then resulted in recommendations from community members, air districts, and then ultimately our recommendation to the Board.

We did look at data of cumulatively exposed communities throughout the state. As you can imagine, there are literally hundreds of communities that could be selected for more specific action in the program, which is why the statewide efforts are so important, because we need to make sure that we're helping all communities not just the very small subset that is selected.

So we did complete the assessments. We did get recommendations from the local boards, as well as from the community groups.

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MS. ARIAS: We went to our Board in September of last year. And before you, you see the ten communities that our Board selected. Three of them were selected for monitoring only. That's Richmond, South Sacramento, and the Barrio Logan area you see with -- as yellow squares.

One of them was selected as an emission reduction program, which is West Oakland, here. And then the other seven were selected for both monitoring and emission

reduction programs. And as a reminder, the statute provided seven months for monitoring to be deployed in the areas selected for monitoring, and one year for emission reduction programs to be adopted by the Board.

There has been monitoring deployed in all of the areas that was met. And there have been emission reduction programs adopted at the local level in all seven -- or all eight communities, sorry.

Oh, and since you guys are not used to all of our maps, the blue is outlining the air districts. So you can see the air district that's responsible for the communities.

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MS. ARIAS: So the air monitoring programs, there is a statewide air monitoring plan. We had to put together a resource on our website that indicates community monitoring, which may actually be some data sets that would be helpful and relevant to this morning's conversation. And there is a data portal that we're putting together for any of the selected community monitoring, as well as any of our air grant funded monitoring that will be coming in. You would be able to access that data. You would be able to download that data and then be able to compare it to the data sets that you're using.

On the right, you'll see some of the basics that we have included for the emission reduction program, metrics for tracking progress, annual reporting, enforcement, strategies, implementation schedules, targets, so on and so forth.

These plans do include five-year targets and then an additional five years of monitoring to ensure that there's no backsliding within the community itself. All of these requirements that you see on the screen are outlined in a blueprint document that our Board adopted last year and we do have that available online.

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MS. ARIAS: So where are we at in the progress?

As I mentioned, all the local boards have adopted their emission reduction programs. And now, statute requires that we take those emission reduction programs to the CARB's Governing Board for their consideration of adoption.

So right now, we're in the middle of community meetings. We're -- the CARB staff are traveling throughout the state and have been attending various steering committee meetings to get direct feedback from the committee members. We've also been in attendance of all the meetings throughout the development of the program.

So once our Board acts, then the districts and the steering committees will also be required to provide us annual reports. And we will be providing that information online so folks can see how progress is going.

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MS. ARIAS: So this gives you a quick screenshot of the -- all the different public meetings that have been happening for each of the communities. You can see on the top line, it gave you information about when the district boards considered them. They all considered them at public meetings, except for Bay Area's was not webcasted, because they did that at a special location here in West Oakland.

So if you are interested in seeing the meetings, you can see them online. Our community meetings -- you'll see we are actually traveling next week to Fresno and Imperial. And then we'll be hitting the South Coast communities in January. Then starting in December, our Board will be traveling to the districts to hear directly from the community members. Our Board will be here in West Oakland on December 5th to hear from the community about the emission reduction program. Then we'll take them to Imperial. Then we'll take them to the valley. Then we'll take them to L.A.

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MS. ARIAS: So the Board last year gave us direction on what we should be considering for this year's communities. We have discussed this with them a few times since then just to make sure that we understand their direction.

The first direction they gave us was any of those three communities -- you may remember it was Sacramento, Richmond, and San Diego's Portside. Any of those communities that voted to move to an emission reduction program and have sufficient data would become first priority for that.

Beyond that, they asked us to think about the priority communities that were recommended both from air districts as well as communities, that we did not put forward. So, for instance, last year the air districts had recommended 15 communities. We did not have enough resources for that, so there was five communities that were not put forward that the districts had put forward. There were also some others that community members had in.

And then, of course, we need to make sure that whatever funding was provided, that we ensure there's enough funding to make sure the 2018 communities can continue their work. So the same conversation you all were talking about this morning, ongoing funding throughout the program is very important.

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MS. ARIAS: So this year, the legislators provided for us the same amount of funding, another 50 million for the air districts to implement the program. Because of the funding constraints, we knew we could only add about three new communities. So what you see here in front of you is staff's current thoughts on where we might be going with the 2019 community recommendations.

Of the three monitoring communities, only the San Diego Portside community voted to move on to an emission reduction program. Both Richmond and Sacramento have decided to wait and continue monitoring before they move forward.

Then the three new communities that we are looking at and potentially recommending for monitoring and emission reduction programs is Southeast L.A., East Coachella, and Southwest Stockton. All of these are consistent with our Board's direction, because we did receive these either as recommendations from the air districts or from community groups last year.

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MS. ARIAS: And as we move forward, you can see here the preliminary boundaries that we are considering for these communities. The preliminary boundaries -- and I can't emphasize that enough. They are truly

preliminary. Because if our Board does select these communities, what we ask is that the air district work with the community. They then put together what we've been calling community steering committee made up of at least 51 percent of residents. And the steering committee will work with the district to finalize these boundaries. So that was the process that was -- happened for last year's communities and we expect that to happen again. So these may change, but at least you can see for now where we are currently at.

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MS. ARIAS: So this is our timeline. We will be putting out our recommendations either the end of this week or the first of next week. And in our staff report, you'll be able to see the three communities. You'll be able to see preliminary boundaries. You'll be able to see emissions inventory data -- preliminary emissions inventory data on the communities, profiles, and so on and so forth.

This is going to be posted, because we want to ensure that folks have 30 days to be able to provide written comment to our Board. So there will be a public docket opened. If you're interested in seeing any of the comments that come in, those will be on our website. And our Board will consider our recommendation at the December

12th and 13th meeting.

Right now, it looks like the item may be on the 13th. But the agenda is always finalized and posted 10 days before. And anybody that's interested can always watch this on the webinar.

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MS. ARIAS: And this our contact information for anybody. We both have the English and Spanish email available. You can call the number. And we have English and Spanish staff available to help. And then, of course, our website, we have everything available in English and Spanish for folks that are interested in the Program.

So now, we're going to transition over. I'm going to have Terry come up and he's going to give you a little bit more specifics on what happened in Wilmington so far. And then following Terry, Brian will come up and he will give you some information about South Fresno. So both of these gentlemen are liaisons to the communities. They have been going to all of the steering committee meetings in these communities for the last year and will continue to work with the District and the steering committee as they implement the program.

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MR. ALLEN: All right. Thank you for having me up here today. I'm just going to give you a little bit of

information about the Wilmington, Carson, and West Long Beach community, which, as Heather mentioned, I was the liaison for.

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MR. ALLEN: Okay. So the population of that community is over 360,000. It's the largest of the AB 617 communities that were selected this year, 43.1 miles of freeways, 72-square miles total, and also of note is that the percentage of Latinos, African-Americans, and Asians is higher in that community than compared to the state of California. Also, the two busiest ports in the nation. I guess that could be arguable depending on what metric you use to say what the busiest port is. But by my research, if you're looking at 20-foot equivalent units, for 2018 and I think 2017, both the Port of Long Beach and the Port of Los Angeles were the busiest ports in the nation.

And another thing just to point out is there's only one -- there's only one boundary around the community. The other two communities that were selected in South Coast have two boundaries. The inner boundary is the impacted community boundary. The outer boundary is what's called the emissions study area.

One of the challenges in this particular community was determining the boundary. So it ended up resulting in instead of two boundaries just having the

single boundary here.

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MR. ALLEN: So the community concerns. Refineries were a major concern. There's five refineries within this community. The ports obviously were a major concern, two ports, and then the heavy-duty truck traffic coming through neighborhoods, the railyards, and then also the oil drilling and production sites.

There was also concern with sensitive receptors and the effects that these sources have on those receptors. So schools and hospitals are examples of those sensitive receptors.

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MR. ALLEN: So this is just a brief list of some of the people that were on the steering committee. There were 34 primary members and 21 alternate members. Environmental justice groups including Coalition for a Safe Environment and Communities for a Better Environment. Also had representation from the City of Carson, City of Long Beach, and the City of Los Angeles. There was also representation from the University of Southern California and also representation from Marathon Refinery as well.

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MR. ALLEN: So the community air monitoring actually kicked off a few months ago in July. The

Community Air Monitoring Plan is up at the South Coast website. The plan looks at mobile, fixed cost, and low cost sensors to do the monitoring. And then the list up there is just a list of some of the pollutants of concern. And then it's important to note that the monitoring areas may be changed based on additional input from either community members or what they get from the initial monitoring.

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MR. ALLEN: And on September 6th, the South Coast Air Quality Management District Governing Board adopted the community emission reduction program, not just for Wilmington but for the other two communities in South Coast as well. There's 18 actions in there that are all based on community priorities to help achieve the emissions reductions.

And those strategies include regulations, incentives, air monitoring, enforcement, outreach, and collaboration. The targets -- there's additional targets in the CERP. These were just two that I wanted to highlight. For VOCs, 20.6 tons per year by 2024 and 64 tons per year by 2030. And then for diesel PM, nine tons per year by 2024 and 20 tons per year by 2030. And then March of 2020 is when we'll bring the emission reduction program to our Board for their approval.

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MR. ALLEN: So just some of the lessons learned. Building trust between community members, and some of the community-based organizations, and the government agencies and industry for consensus building can be difficult. There's still some mistrust there from the community members, mistrust in government and in industry.

So one of the issues that some of the community members take is the fact that industry sitting on the steering committee to begin with. Some community members feel like the steering committee should only be community members.

Also, because this community, like a few of the other communities, had both the emission reduction program and an air monitoring plan, there was a large volume of information that had to be pushed out to them. In fact, I don't know if one of the meetings ended on time once. They all went over just because there was so much information to get out there and still probably didn't get everything out there that needed to get out there. But we -- or South Coast did the -- did a great job, did the best they could.

And then another challenge was just defining what CARB's role in this whole process was early on and educating the public on the blueprint and what the

requirements are in there.

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MR. ALLEN: So these are just a few resources, Assembly Bill 617, our webpage for Community Air Protection Program, and then below that a link where you can get the blueprint, and then my contact information.

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MR. MOORE: Well, hello. As Heather said, I am the South Central Fresno version of Terry.

(Laughter.)

MR. MOORE: And so the format will follow pretty similarly. So I do work in South Central Fresno. And to give you an idea, this gives a -- I think this will be a great contrast.

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MR. MOORE: You'll see certain things that are similar challenges between communities and you'll also see a lot of differences. So again, looking at the size, just the size of the area in South Central Fresno you can see. The population is almost a third of down in Wilmington. It pretty much captures just north of downtown Fresno and then goes south almost to like the urban rural interface, which is kind of unique with South Central Fresno down there in the bottom.

To give you the idea about preliminary boundaries

versus final that Heather mentioned, the preliminary boundaries for this community were actually that diagonal. You see like 99 there, that's where the west boundary ended preliminarily. And then the community steering committee got together and they wanted to push that out west to capture a lot of residential areas and sources west of the 99, as well as south.

There are three major freeways that kind of form within this community. There's a lot of industrial and warehouse operations in the south area. It's called the -- actually, it's called the industrial triangle. You can see it right there in green. So that was a big area of concern for these individuals.

And again, I think CalEnviroScreen was mentioned earlier. That if you look at the cumulative score, which takes into the fact socioeconomic factors, exposure factors. Every census tract that this boundary touched was above the 97th percentile.

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MR. MOORE: Community concerns. So there are some overlap with Wilmington, but a lot are unique. A big one was truck rerouting. So with the new warehousing, a lot of more historically residential roads were being used by heavy-duty trucks. So that was a big concern. And this is a unique case, because truck rerouting is

something that we don't have authority over, nor do the local air districts that are convening these meetings, which has required us to work with the city and county to see some of these strategies implemented.

Heavy-duty diesel truck emissions were also a really big concern with the warehousing. And just plus emissions that those warehouses would be bringing to it and the type of equipment used actually at the warehouse were of a concern.

There's an area kind of on the southeast of that map that actually -- there's a school and a small community of Malaga that was a really big concern. There's some stationary sources there. There's a biomass facility and a glass plant that the community was concerned about.

And especially in winter in Fresno, residential wood burning is a huge concern. Right now, you can see over the last two months, the daily average of PM2.5 is really about three or four times higher than it was just like in early September, because of the change in weather, and the use of residential wood to heat houses, changes in fuels, a lot of things.

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MR. MOORE: As far as our community partners, we had in Fresno four or five really substantial well

organized community-based organizations, which is different from community to community. Some communities really don't have much established on the ground. Where others have one or two really prominent ones, we had an interesting case where there were four or five. So that led to some of the challenges. Not always did these community groups agree with each other, much less the District or with what we at CARB were doing, so we definitely had to -- had to build consensus.

City of Fresno, because so many of their concerns had to deal with land use with the industrial area and the truck rerouting, we really had to try to bring in the city to work with us. And they've been really open. They've been attending every meeting and have actually presented a few times to the steering committee.

Another group we've worked with, the Strategic Growth Council. There's a big community grant being implemented on the west side of Fresno that SGC is handling. So we've been trying to work with them across the agencies to implement and see where we overlap, so we can make sure we can leverage funds where that works.

And again, there's a lot of public input through these community steering committee meetings. The public is allowed to attend, participate in a lot of the exercises, and give their input as well.

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MR. MOORE: As far as community air monitoring, just like in Wilmington, in July, they began implementing their plan. So two PM2.5 monitors are actually now deployed and collecting data, which is really neat to look at. And they're hoping to get the rest of them deployed by the end of this year. And I think they're getting pretty close. And that right side is just a map. It's from the Air District document showing kind of where these air monitoring assets are being placed throughout the community based on community concerns.

As far as community concerns, a little similar to Terry, PM was a big concern, air toxics, as well as VOCs associated with not only combustion but fuel distribution. There's some fuel distribution centers in the south side of this community that are a big deal. And pesticides has come up recently. The last few meetings we've had, because of some of the more rural farming areas around the southside of this community the concerns have been raised. And We've been working with the Department of Pesticide Regulation on that side of things.

And different from what Terry mentioned, the community steering committee in South Central Fresno, instead of going with low-cost sensors and kind of like saturating the area, they're really interested in

regulatory grade monitors. So they decided to go with more expensive monitors that were pretty high fidelity and just less of them. So every community is a little different, the type of community air monitoring they decide to implement.

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MR. MOORE: And in September 19th, the Air District Board did approve a community emissions reduction plan with a ton of strategies that have been based on community needs. And we, the CARB - and I want to make this clear - CARB public hearing to consider approval of the CERP. We have our policy expert, Anna Scodel, reminding me to get that right, that we are considering to approve it. We don't want to predispose that the plan will be approved. Left that word out. Words do matter, Anna. I know.

So, yes, that's going to happening in February. And that's also going to be -- Shafter is another community within the San Joaquin Valley that will also be considered for approval their emissions reduction plan in February.

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MR. MOORE: Lessons learned. A big one was cultural competency. Definitely on the global scale, it's super helpful to have staff members that are

knowledgeable, and comfortable, and effective with communicating with people with different cultural backgrounds, right? So we worked closely with our environmental justice unit to help facilitate that. On a more specific level, it was really helpful. We had a lot of the community groups took us on community tours before. So learning out of the history of the Calwa, which is a local area. How it started out, you know, as wine growing area and then the railyard came through and changed the dynamic of that community. So really getting to know not only large umbrella idea of cultural competency, but really getting to know the areas and the history of the areas was super helpful. And we'll definitely try to do that in the future communities.

Similar to Terry, the historical relationship between the Air District and lot of these community groups wasn't like the best. So bringing them together and having them meet each other and talk face to face I think helped, but could be a challenge.

Rules and responsibilities, the boundary dispute in South Central Fresno who made that final call, I think we had four months of meetings just to decide the final boundaries. So that was a challenge. In the future, we're going to try to really get that set earlier on in the process. One that was set, we actually moved pretty

well, but it did take us a long time to get the -- get the ball rolling.

Consensus building versus voting was a big issue within South Central Fresno. How would the steering committee proceed if there was a difference of opinion, right? That was part of the charter development was how we would -- well, there were disagreements, how would we make a decision?

And finally, that collaboration with public agencies. A big deal with the land use. Going to the agency of authority, whether it was State or local, and really develop working relationships with these agencies that didn't really have any skin in the game. They weren't statutorily required to do anything, but we would like them to participate.

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MR. MOORE: Then again, the same resources as Terry showed. And if you have any specific questions about South Central Fresno, I have my contact information there on the bottom.

That's it. Thank you.

CHAIRPERSON SCHWARZMAN: Thank you so much. We have 10 minutes for just sort of clarifying questions and then we have more chance for discussion after the next presentation.

I have one question about if we want details on those 46 strategies for Fresno and 18 strategies for Long Beach, I took a quick look on the website under the blueprint and couldn't immediately figure out where I would find that.

MS. ARIAS: Yeah, great question. So -- and just as a reminder, this is only two of the emission reduction programs. There are, as I mentioned earlier, seven total that have been adopted. We do have all seven on our website. You go to Community Selection on the left-hand side and then you click on 2018. And in there is a link that sends you to a website that we have the -- all of the emission reduction programs linked for you and uploaded.

CHAIRPERSON SCHWARZMAN: Under selected communities?

MS. ARIAS: Correct, selected -- Community Selection and then 2018.

CHAIRPERSON SCHWARZMAN: And then if we clicked on one of those air districts, we would get the --

MR. MOORE: AB 617 page.

MS. ARIAS: He's saying go to the Air District AB 617 page. Do you want to walk up onto her laptop really fast and show her.

MR. MOORE: I can show you afterwards.

MS. ARIAS: We would be happy to send you all the

links -- the direct links.

CHAIRPERSON SCHWARZMAN: That would be great.

(Laughter.)

CHAIRPERSON SCHWARZMAN: Thank you.

Other questions for our speakers?

Jenny.

PANEL MEMBER QUINTANA: Just a clarifying question. There's another round of communities being proposed by the air districts, right --

MS. ARIAS: (Nods head.)

PANEL MEMBER QUINTANA: -- that is not reflected here?

MS. ARIAS: It is reflected. So the 2019 recommendations of the three and the Portside, those were the recommendations that we also received from the Air District. So South Coast recommended the South East L.A. and East Coachella, and San Joaquin Valley recommended the Stockton community, and San Diego recommended moving Portside. We have not received any other recommendations from the other districts that did not caveat additional funding needs. So since we do not have additional funding needs, we will only put forward the ones that would -- we could do within the funding we have.

PANEL MEMBER QUINTANA: I see and no new funding is going to be available or it is going to be available?

MS. ARIAS: That would be up to the legislators.

PANEL MEMBER QUINTANA: I see.

MS. ARIAS: That's on an annual basis they've been considering it.

PANEL MEMBER SUÁREZ: I have a question.

CHAIRPERSON SCHWARZMAN: José.

PANEL MEMBER SUÁREZ: So are you thinking about tailoring the assessments and interventions to each one of the communities exposed? You mentioned that in Fresno one of the concerns, too, was with pesticides. Are you -- have you given much thought about that how you would implement something?

MS. ARIAS: Yeah. So it was actually an even greater concern in Shafter. So if you have an interest in learning about what's happening with pesticides and how we're working with the Department of Pesticide Regulation, the Shafter report is really focused a lot on that. That was probably their top concern.

And so what we did is, since that is not our area of expertise and not our authority, we did reach out to our sister agency, which just happens to be on the same floor as our Branch and we brought them into meetings. And even Val Dolcini, who is now the recently named Director, he, himself, has gone down to Shafter to several of the steering committee meetings. DPR has talked about

existing monitoring that has concluded and shared results with the community. They've talked about potential monitoring going forward. They've talked about regulatory action that they're going to be undertaking and making sure that the community has direct input into that. They've also been talking about different types of best practices that they could work with the community on identifying. The Ag Commissioners have been very involved in the conversation.

So in Shafter, in particular, that really became the forefront issue very early on. And that really pushed that conversation forward. As Brian mentioned, pesticides has just recently come up more of a conversation in Fresno. So what we're trying to do now is take DPR to Fresno and start some of those conversations there, as well.

PANEL MEMBER SUÁREZ: Got it. But technically the funding of the program cannot be used for that, it has to come from other sources?

MS. ARIAS: It can. It can be used for that. So there's different -- but there's two different funding pots. There was almost 750 million, not quite, but almost $750 million that the legislators provided to be able to reduce emissions from mobile sources. And then this last year of funding they also provided opportunities for

stationary sources, as well as what we're looking at is called pilot projects, that are compatible with the emission reduction programs.

So there is a slight possibility, if the emission -- if the community and the District can come up with an idea of maybe what they might want to try and pilot with some of those funds. Now, that is set aside from the implementation funding. And as I mentioned, the districts just received another 50 million. So the first year they got 27, the second year they got 50, and this last year they got 50 million for implementation.

That implementation funding can be used for things like monitoring. That's what they're using to pay for their monitoring. They're also using that funding to help pay for staffing resources for all of this, to pay for things like facilitators, because we've really seen and needed the use of facilitators -- third-party facilitate at all these meetings, as well as in some of like the smaller districts, in Imperial, they hired a consulting firm to help them write.

But they have a lot more latitude with that money. So they can use that money to help administer the program how they see fit. However, it's not nearly enough funding. They've -- they've -- actually, most of the districts have had to pull funding from other pots to be

able to do what they needed to do.

PANEL MEMBER SUÁREZ: And since you mentioned pilot programs, tell me a little bit about that. Who -- what's the target, and who can apply for that, and how much?

MS. ARIAS: Yeah. So they haven't developed them yet. And our agency is working on putting together some parameters for them on that. So our Mobile Source staff is working with the air districts to kind of put together the rules, if you will, for that particular program. But the idea is to make sure that there is some accountability, put not make it too structured, so that we can see some opportunities for some emission and exposure reductions. So we will be happy to send you some information as that continues on, if you'd like.

PANEL MEMBER SUÁREZ: I guess my question was with regards to -- so is this something that counties can apply for or is it investigators within certain institutions, what's the thought process there?

MS. ARIAS: Yeah, it all depends on really what the -- I mean, traditionally in our programs -- because our programs have always been engine turnover. You know, it's been the owner or operator of the engine that applies for the funding or like in the stationary source case, it would be the owner of the facility that would apply.

We've recently added funding for schools to be able to put our air filtration, so it would be the school that would apply.

But with this pilot, it really depends on what the idea is, right? And then -- so then it depends on if it's a piece of equipment or something that they want to swap out, it would be the owner. If it's a facility, you know, it would probably be the facility operator. So it really depends on what kind of source we're talking about.

Sorry, we don't have more clarity on that yet.

PANEL MEMBER SUÁREZ: That's great.

CHAIRPERSON SCHWARZMAN: I had a question about the CERP targets.

MS. ARIAS: Sure.

CHAIRPERSON SCHWARZMAN: Just clarification on the Fresno ones, where the targets were -- so you might even put this one back up, if you don't mind. It's slide -- I'm trying to see the numbers. Six, I think on the Fresno -- where it's 20.6 tons per year by 2024, 64 tons per year for VOCs by 2030. Are those reductions?

MS. ARIAS: Um-hmm. Those are --

CHAIRPERSON SCHWARZMAN: To reduce emissions over baseline by that much by that year?

MS. ARIAS: Right. Correct.

CHAIRPERSON SCHWARZMAN: Okay. That's --

MS. ARIAS: From the baseline inventory.

CHAIRPERSON SCHWARZMAN: That's not the right one.

MS. ARIAS: Yeah, I think she was actually looking at the Wilmington.

CHAIRPERSON SCHWARZMAN: I was looking at -- oh, my bad. I'm sorry. I said Fresno and I'm looking at Wilmington.

MS. ARIAS: It's okay. In both cases -- yes, in both cases, Fresno and in Wilmington

CHAIRPERSON SCHWARZMAN: That's my mistake. So this is --

MS. ARIAS: Yes.

CHAIRPERSON SCHWARZMAN: --- volumes, or mass, whatever, of intended reductions per year by those years?

MS. ARIAS: Total tons by 2024 from the baseline year.

CHAIRPERSON SCHWARZMAN: Got it. Okay. And what's -- and what's the -- is the baseline year 2018?

MS. ARIAS: Correct.

CHAIRPERSON SCHWARZMAN: And, I'm sorry?

My other question was any of the monitoring that's been done so far, as sort of a segue to our next presentation, it's all been air monitoring, right?

MS. ARIAS: Correct. That's right. It is all --

the statute specifically says air monitoring.

CHAIRPERSON SCHWARZMAN: Yes, please.

DIRECTOR ZEISE: Just a follow-up. Just a Real quick follow-up. So what's the baseline tonnage?

MS. ARIAS: It depends on which pollutant you're looking at. And there is a significant amount of technical data appendices to all of these emission reduction programs that give you a full inventory for each of the communities.

DIRECTOR ZEISE: Do you have a relative idea of the percent? So if -- a relative idea of the percent. So if you take the VOCs, what --

MS. ARIAS: I'm trying to remember South Coast. Off the top of my head, I don't remember it. They had a very nice little chart that they put to their -- to their board, but we'd happy to send that to you as well. I don't want to misquote it.

CHAIRPERSON SCHWARZMAN: Yeah, Sara.

MS. HOOVER: Hi. This Sara from OEHHA. I just was wondering if in the concern about pesticides, if there were any specific pesticides that were discussed? And then I also wondered if you could -- you've talked about some of the unique aspects of the communities, if there's anything else you want to highlight for the other communities that we haven't talked about, either concerns

or exposure sources.

MS. ARIAS: Let's see specific pesticides. I don't recall off the top of my head what was the top pesticide from the data that was provided. So DPR did go through all the data with them. But again, we can get that for you, if you'd like.

And then -- I'm sorry, the other question was about the community concerns?

MS. HOOVER: Just -- I have to talk into the mic. To repeat that, I -- we've heard about some of the unique aspects of a couple of the communities. If there's anything else that jumps out at you in terms of either pollutants, or concerns, or exposure sources that are -- you know, that vary or are unique with other communities?

MS. ARIAS: Okay. So before I get started on that, I will say the one thing that came up in all communities was truck idling. And we have -- hear about that all the time. So we are actually doing some work on that. We went back and reanalyzed the regulations analyses. We adjusted it based on OEHHA's most recent health recommendations. So we're starting to go out and talk about that analyses.

But, let's see, individual concerns. Sacramento, as you can imagine, is mobile sources because of the proximity to the freeways. Certainly here in West

Oakland, a lot of the diesel from the port itself. There is also some concerns about fire, meaning people burning at night and on the weekends. And Shafter pesticides for sure.

San Bernardino is a lot of the warehouses. They're also concerned about OmniTrans. And really that was more of an odor concern, because of the natural gas buses that was there. So the community really wants a huge push for transition to all zero. They are not happy with the natural gas. They want all zero.

In East L.A., there is a rendering facility that is a big concern of the community. They are also very concerned about not only the heavy-duty traffic, but the light-duty traffic, because of their location and proximity to all the freeways. And we talked about Wilmington already.

And then down in San Diego, again, huge concerns with the port traffic that's coming in and out there.

CHAIRPERSON SCHWARZMAN: That's really helpful - thank you - to hear that overview.

Any other questions or comments? We're doing okay for time. And then we have more time for discussion afterward. But thank you very much --

MS. ARIAS: Thank you.

CHAIRPERSON SCHWARZMAN: -- for coming and for

your presentations.

Next, I would like to introduce Duyen Kauffman, who is the Health Program Specialist in OEHHA's Safer Alternative Assessment and Biomonitoring Section. And she's going to introduce our afternoon discussion session with a presentation.

(Thereupon an overhead presentation was presented as follows.)

MS. KAUFFMAN: Hello. Great. Thanks, Meg and good afternoon, everyone. So I'd like to take a few minutes now to frame the afternoon discussion session.

The purpose of this session is to explore -- to begin to explore next steps for biomonitoring in AB 617 communities, including goals of the biomonitoring studies and possible considerations for selecting communities for biomonitoring.

So we'd like to hear from the Panel, guest speakers, community members, and other people in the audience about the factors we should take into account as we begin to plan for biomonitoring in these communities.

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MS. KAUFFMAN: So, first, let me provide a little background for our discussion. We do have a new program in OEHHA, the Environmental Health Support for Communities, which has been designed to support CARB,

local air districts, and impacted communities in implementing AB 617.

And the 2019-20 State budget allocates resources for four permanent positions, so one Staff Toxicologist, two Research Scientists, and one Senior Environmental Scientist, and then limited term contract money at $350,000 a year for three years.

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MS. KAUFFMAN: So the major elements of the new program are evaluating and interpreting potential health effects that may result from community exposures to air toxics and the health benefits from reducing emissions in these communities.

For previously unassessed pollutants, we'll be developing necessary health guidance values. And last but not least, we'll be designing and implementing targeted biomonitoring studies in affected communities.

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MS. KAUFFMAN: So these targeted biomonitoring studies will aim to complement and validate air monitoring in select communities and increase our understanding of exposures and potential health risks faced by residents of the communities.

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MS. KAUFFMAN: So we have already been doing some

work related to AB 617, including the East Bay Diesel Exposure Project, which you just heard about this morning from Asa. And in addition to that, we've been engaging with AB 617 communities and local air districts through the monthly steering committee meetings. And thus far, we have visited all 10 communities at least once and are attending some of those meetings regularly, since the beginning of the year.

And lastly, we have also been doing some -- working on a cross-agency working group with CARB staff, so we can -- as we plan our respective activities around AB 617. And those meetings will be ongoing.

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MS. KAUFFMAN: So as I -- I mentioned earlier the focus of the session is to discuss targeted biomonitoring studies in AB 617 communities. And some overarching goals for those studies include: measuring exposure to chemicals of concern in people, establishing baseline exposures prior to reduction efforts, examining exposures associated with specific sources in the community, and/or evaluating the effectiveness of exposure reduction efforts.

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MS. KAUFFMAN: So as I also mentioned earlier, we have three years of contract money. So this means we can launch targeted biomonitoring studies in a subset of the

AB 617 communities. With that in mind, here are some of the factors we might consider in selecting communities for biomonitoring.

So chemicals of concern that can be biomonitored, which could include PAHs, VOCs, pesticides, and metals.

Geographic coverage of the state. Ideally, we would have a range of locations across the state.

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MS. KAUFFMAN: Nature of exposure sources. We could also consider population characteristics, such as demographics like socioeconomic status, and primary languages spoken, and pollution burden, and other stressors.

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MS. KAUFFMAN: Another important consideration would be identifying community partners to assist with recruitment/engagement efforts. And we'll also be seeking research partners to work with on study design and implementation, similar to our EBDEP collaboration with UC Berkeley.

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MS. KAUFFMAN: Logistics will play a role in launching these targeted biomonitoring studies, such as available infrastructure, like facilities for sample processing and storage. And the timeline of the contract

money availability in conjunction with where the community is in the AB 617 process will also be a consideration.

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MS. KAUFFMAN: I also wanted to mention the option for complementary studies as another discussion topic for today. So these types of studies could aid in the interpretation of biomonitoring results, as we found in EBDEP with indoor air and dust measurements of 1-nitropyrene. We're also exploring measuring biomarkers of effect and/or the possibility of conducting some non-targeted screening analyses.

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MS. KAUFFMAN: As a reminder, today is just the first step of an open public discussion. And we're also planning to hold facilitated workshops in the future. And we'll be looking at other ways, like electronic surveys, to obtain additional input from communities about priorities for biomonitoring studies.

And as always, we welcome feedback at any time through our email address shown here, biomonitoring@oehha.ca.gov.

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MS. KAUFFMAN: So now I'm going to leave you with this summary of the discussion topics for the afternoon session. The overarching goals, which can inform the

design of the biomonitoring studies and the possible considerations for selecting communities for biomonitoring that I just outlined.

So we would also appreciate hearing any other considerations we should take into account as we move forward in this process. And with that, I'll turn the floor back over to Meg, who will be facilitating the discussion.

CHAIRPERSON SCHWARZMAN: Thanks so much, Duyen. We have a significant portion of the rest of the meeting dedicated to this conversation. Basically, we have until 4:00 o'clock, if we need it. And so we have a nice long time to explore these topics.

And one thing that you might say a little more about, Duyen, or maybe someone else could is how you're thinking about -- what your initial thoughts are about including kids and/or pregnant women specifically in these studies, like little kids.

MS. HOOVER: This is Sara Hoover of OEHHA.

We are really -- we literally are -- this is our first public discussion, so we welcome any input on that.

You heard this morning some of the challenges that we had in recruiting children, so that's a consideration. But really, I would just open it up to the Panel, and other discussants, and people on the web about

what your priorities would be. And we've really made no -- you know, we're just really in the initial discussion phase. So we're open to hearing any input on along those lines.

CHAIRPERSON SCHWARZMAN: I'm interested in those populations --

(Laughter.)

CHAIRPERSON SCHWARZMAN: -- with regard to these exposures. And I feel like particularly when you're engaging with communities, for obvious reasons, often understanding impact of these exposures on children's health can be very meaningful and influential. And I wonder about the support that the Program could get from talking with obviously groups like Asa's that have been working with -- not only as in the EBDEP study with parent-child pairs, but also for almost two decades now in the CHAMACOS program of -- you know, I don't think these studies -- you're able to design these with that kind of time frame in mind. But with a few years at least, is there possibility for any kind of longitudinal aspect to it?

You're raising the possibility of a longitudinal aspect, in terms of getting a baseline and then studying the outcomes of the interventions. But I'm sort of -- it's evidence that I would love to see about the impact

and the influence of the interventions, particularly on those subgroups.

That's all I'll say for now. Let other people chime in.

Yeah, Jenny.

PANEL MEMBER QUINTANA: Yeah. I was wondering I guess as you're seeing how to get something going quickly, because if you're going to show a baseline and then show an effect, you want to get samples quickly. And so I was wondering about the possibility of trying to collect samples, even without out a plan, as it were, and archiving them, if there would be money for that.

One thing that kind of is a hybrid of longitudinal and cross-sectional studies following on your idea, Meg, was what if you -- I'm just thinking, say a neighborhood affected by diesel near a school, if you could monitor body burdens of fourth graders every year. It wouldn't be the same fourth graders, but it would be at least the same age group. And perhaps the same month of the year every February you try to monitor them or something. You would have a little bit of reporting power for exposures.

But I guess that brings up a bigger question, which is are these subjects being monitored still required to be identified and reached with biomonitoring results

return as our typical studies are, because that might be a barrier to community groups participating, if they're identified. Particularly with urine sampling, people associate that with drugs of abuse monitoring. They may have concerns about what's going to be done with their data.

So I was just curious if it was absolutely locked in stone they had to be identified or if they could be de-identified for these types of projects?

MS. HOOVER: This is Sara again. What you do mean by identified? Because, of course, everything is strictly confidential. But it would be the same design as EBDEP. We are required, under Biomonitor -- we're running it under Biomonitoring California. We have to return results to individual participants, but we don't --

PANEL MEMBER QUINTANA: I guess that was my question, if this fall -- fell under that --

MS. HOOVER: Yes.

PANEL MEMBER QUINTANA: -- complete requirement or not?

MS. HOOVER: Yes, it does.

PANEL MEMBER QUINTANA: Because you collect a sample, and collect a questionnaire, and just collect a number and never collect a name, you know, that kind of thing.

MS. HOOVER: No, we're require by law to return results to participants who request them. They don't have to request. But if a participant requests their results, we must return those results.

PANEL MEMBER QUINTANA: But they could opt out. They could decide not to?

MS. HOOVER: Yes.

PANEL MEMBER QUINTANA: Okay.

MS. HOOVER. That's always true.

PANEL MEMBER QUINTANA: Okay. Thank you.

MS. HOOVER: Yeah.

CHAIRPERSON SCHWARZMAN: I want to make sure everybody knows that this discussion is open to everyone, not just to Panel members in the room and beyond the room. So we have plenty of time to kick around ideas and we'd love to hear from folks.

PANEL MEMBER SUÁREZ: I have a quick question. So there's been discussion about how we can tie in some of the biomonitoring activities with health outcomes, which is kind of what you were getting at, correct?

Although, technically speaking, looking at health outcomes is not one of the main core pieces of the Biomonitoring Program, as it's just measuring the exposures. And so I guess in that sense, it makes -- it falls within the scope of that and looking at

interventions if that has an effect on the exposures. But I think the next level of that will be, well, how can we maximize that use, even though it's not really a priority or an objective of the Cal -- of the Biomonitoring Program to look at health outcomes.

Is there an easier way in which we could stimulate that to happen? It wouldn't have to happen with funds from the Biomonitoring Program, but more so applying elsewhere and collaborating with other investigators. So that's kind of what I was trying to get at. So how can we make it so that it's more of an interactive process, so we can start looking at health outcomes and it's kind of win-win?

MS. HOOVER: Yes. So actually I realized we left that off of our discussion topic slide. That is options for complementary studies. And we've actually been thinking about that.

So I am in the position currently of having salary savings, because of not being able to fill some of my positions, which does give us the option of funding other kinds of studies that are related to our main goal.

So we are looking at that. We're definitely looking at trying to figure out biomarkers effect -- of effect. So if you have any thoughts on that particular topic, that would be great.

And also, just echoing back to what Jenny said about collect -- you know, getting out there, collecting samples, storing it. That's actually something that Duyen had brought up. And we realized yeah, because one of the issues that we're facing with three years of contract money is that we have to encumber the money and then spend it within two years. So we have a very small window, so we did think about exactly what you're saying, which is get out, collect samples, store them, go back three years later, and collect more samples, and compare.

So that's part of the factors that you could all think about in terms of selecting communities for biomonitoring in terms of where they are in the AB 617 process.

PANEL MEMBER SUÁREZ: Because as you well know, that National Institutes of Health funds a lot of this stuff. And they're interested in the other part, right, what health outcomes then are changing according to exposures and whatnot. And there's a good amount of funding that could be channeled for that. How hard is it for somebody to start, if -- you know, if you have access to biospecimens, then you can look at a lot of health biomarkers too through biospecimens. How difficult or easy is that to start developing those collaborations? Is that something that you do want to put on the website or

somewhere, disseminate it, so more people start perhaps using the stored biorepository or whatnot.

MS. HOOVER: I think you're asking like would we request proposals, you know, collaborations for people to take our samples and test, is that what you're saying?

PANEL MEMBER SUÁREZ: Right. So if that's of interest and -- and what I'm trying to get to that is addressing the health outcomes and also, at the same time, perhaps help a little offset some of the costs too of just storing all this biospecimens, which does cost money and starting to defray some of those costs too for -- from other pots of money, if that's possible.

MS. HOOVER: So I think -- is Robin still here or -- okay. I mean, I would say that we would not offer our samples to other researchers for that, because it wouldn't fall within our consenting. So we would have to be involved with the design of the study from the ground up and consent people directly to do that kind of work. So, no, we wouldn't be able to do that.

PANEL MEMBER SUÁREZ: Right. But I guess thinking now forward if that's of interest, then start putting -- maybe consenting -- obtaining consent in that regard --

MS. HOOVER: Yes. Yes.

PANEL MEMBER SUÁREZ: -- so that that could be a

possibility in the future.

MS. HOOVER: Yes. And just as we did with EBDEP, we had our biomonitoring piece -- we had our complementary piece, which was funded by OEHHA, you know, and we returned results for environmental samples from UC Berkeley. So we had -- you know, we dealt with that in a collaborative way. So that's the kind of vision I have for -- a similar vision for biomarkers of effect is identifying a researcher to part -- researcher to part -- partner with, including it in the consent, and so forth.

CHAIRPERSON SCHWARZMAN: So just to tack onto that for just a moment before we change topics. This might be a little bit out there, but sort of thinking about how to accomplish what José is talking about. Anyone happened to know longitudinal studies that were happening on say, okay, I need to start where I started in my mind with this, which was like the evidence about asthma rates in Bayview-Hunters Point in San Francisco having to do with the Superfund sites there, and the shipyard, and the freeways, and all of that. And is there somebody doing longitudinal health effects studies with people who are already enrolled, but who they're doing -- tracking in a longitudinal way?

This is kind of out there, because you'd have to find it happening in a community that you were interested

in from -- it would have to be a AB 1617 community -- 617 community. So anyway, where somebody is already doing a health effects study and you can add a portion of it, which is biomonitoring. Because so much of the -- you know, if you're talking biomarkers of effect, it's really limiting. But if you have somebody who's already looking at clinical outcomes, like asthma, they're doing the clinical outcomes part of it and you can add a biomarker of exposure element to it.

I guess it's just sort of to put the question out to the universe --

(Laughter.)

CHAIRPERSON SCHWARZMAN: -- for people who know of longitudinal health effects like partic -- studies, particular in kids maybe in these communities. You know, is there a Kaiser study going on in one of these communities that's clinical outcomes, where you could -- and they're -- they already have participants enrolled in a longitudinal study. So you still have access to the participants to consent them for a different aspect of the study.

PANEL MEMBER SUÁREZ: I can tell you a little bit about what NIEHS - so this is the National Institute Of Environmental Health Science is - what their approach has been in that, which is to take the other side of it. So,

for example, they funded the Children's Health Exposure Assessment[SIC] Resource, in which they had called for applications.

So for kind of going the other way around. If you have an investigation of certain characteristics, then you can apply to have your biospecimens be measured by their local labs. So it's kind of getting at what you're saying, but it's like at a different perspective, right?

So there's this opportunity to measure at a low cost or for free these different chemicals. And we're trying to track people that do have the outcomes that may be -- it may be of most interest or concern for us.

So that's kind of a little different model, but it's an interesting way to frame it too, if that's another way to do it. But at the same time, then you're limited to what are the scopes that -- what are the populations that the studies included, which may not necessarily be as generalizable as we want it to be for the Program. So I think there's a lot of thinking, but these are two different ways to look at it.

CHAIRPERSON SCHWARZMAN: Yeah, Asa, please.

DR. BRADMAN: Three comments related to that.

One, to follow a little bit up on this discussion. What you kind of described is exactly what the ECHO Program is doing through NIH, where they took --

were trying to identify cohorts that did not have an environmental component and then add additional funding to leverage those resources. So, I mean, one, we should look at some of the ECHO Programs here in California. But I think what you're talking about actually has a model at the federal level.

And a little bit to follow up on what Dr. Suárez was talking about. I mean, I think there's an opportunity here to perhaps collaborate with academics. For example, Chris and I were talking about maybe there's an R1 here in the -- you know, in the diesel exposure front that could be a collaborative effort with the Biomonitoring Program. And that would be relatively little investment from the Program, in the sense that you have academics who are going to kill themselves to write grants. So that might -- you know, use their resources, but not take away too much time and effort from the Program, but may generate, you know, a good return in terms of more research money.

And the third thing was your mention about interventions. I just want to echo that. You know, I -- we've had some discussions on campus and how to -- you know, we have policies now, more -- you know, that -- trying to address environmental health issues. And I think it's really important to evaluate them. And I know

from personal experience intervention studies and evaluating the impacts of policies is hard and often fuzzy.

But I think it's crucial if we're going to, one, see what works, and two, also justify some of these programs. So I want to just echo what you said about the need for interventions and evaluating them.

CHAIRPERSON SCHWARZMAN: It's like your plan, I was going -- that was going to be the next point I brought up, because it's certainly on all the lists of potential priorities. And it's -- you know, when Lauren was reviewing the recommendations of the Panel from the July meeting, we added that seventh priority, which is intervention studies. And so I think we all see eye to eye on this.

But I wanted to specifically talk about my experience in trying to evaluate policy impact around -- as some of you know, I currently have a study looking at the impact of Prop 65 on population level exposures to some of the Prop 65 chemicals. And one of the investigations we've been doing is on diesel engine exhaust to Prop 65 chemicals, which is not a chemical obviously - Prop 65 substance.

And there are some particular cases studies with Prop 65 around school buses and grocery store distribu --

grocery distribution centers. And in both cases, there's good exposure science from before and there's no assessments after the intervention.

And it completely ties our hands about describing anything about the impact of that intervention. We can't say -- we can only say, well -- and in the -- anyway, there's other problems that plague that. But the basic point stands that, you know, there's some baseline data and there was no data following the intervention. And sometimes we have the opposite problem, right, where there's been an intervention, and people look at the exposures, and we don't have a baseline.

And this is such a cool opportunity to do both. And I really appreciate that the Program is thinking about and what Jenny mentioned about quick establishing some baseline data. And it's tricky to think about how to do that in a way that will be most relevant to the post-intervention data that you want to collect.

MS. HOOVER: This is Sara again. We do have an opportunity that I'll just raise, which is Richmond did not vote to proceed to emissions reduction. They're still in the monitoring phase. We have strong connections in Richmond from EBDEP and also Duyen has been attending all the steering committee meetings for, how long now, a year? About a year or less -- little less than a year.

So that actually is in our mind of we have a potential opportunity to go into Richmond, collect some baseline samples, wait, you know, till the end of our funding to go back and collect more samples, and then analyze them together. So that's a -- that's a possibility we have in mind. So we'd love to hear your thoughts on that.

The only other thing I wanted to say is -- and we've talked about this with Heather's group, one of the reasons we mentioned options for complementary studies is we're not 100 percent restricted to the current AB 617 communities. So there's a possibility of going into neighboring communities or doing -- or trying to do something more than what we're -- what is originally planned in the new program.

So that's another thought about if there are opportunities that aren't necessarily in AB 617 communities, that's still something we'd like to hear about just to be proactive going forward.

DR. ATTFIELD: Thank you. This is Kathleen Attfield for Biomonitoring California.

I just want to raise a sort of side-point that helps us sort of frame thinking about longitudinal studies or intervention studies of many of the chemicals of concern that might be related to this, our short half-life

chemicals, our chemicals that have a lot of within-person variability. So this is really going to make us have to think about taking multiple samples or having a very large N to be able to, you know, adapt to the limitations of what one individual measurement could tell us about a community. So I just want us to factor that in that you could set up the situation where you don't learn what you want to, because there's so much within-person variability.

CHAIRPERSON SCHWARZMAN: Do you have something?

MS. HOOVER: No, I was just checking.

CHAIRPERSON SCHWARZMAN: Go ahead, Jenny.

PANEL MEMBER QUINTANA: I was thinking of the 1-nitropyrene metabolites within-person variability, people keep saying it has a short half-life, you know, 15 hours or something, is that right, Chris?

DR. SIMPSON: Twelve to 15.

PANEL MEMBER QUINTANA: Twelve to 17 or something. But that's very similar to the half-life of cotinine in the body, which is metabolized nicotine. But cotinine is an amazingly stable marker, because people's exposure is very stable to people they live with or whatever. So if the exposure were quite stable, like at their home, even though something has a half-life, it may be seasonal or explicable by seasonal variables, and not

constrained so much, because the actual half-life is short if the exposure is continuous, you know.

But I also think, in terms of health studies, I think -- I'm on the AB 617 consultation group community -- it's called community something group.

I know the communities really want health effects studies, but -- including the community I work with, San Ysidro near the border. But there are a lot of times the communities are -- if it's something like hospital visits or ER visits for asthma, it's quite a rare event. So that it's really not possible to do a health effect, unless a community is very large, like it sounds some of the AB 617 communities are. You have to have a pretty large community to do a health effects -- clinical health effects study, even though biomarkers of effect might be okay with a smaller sample.

So that's just something else. I guess I'm voting in favor of exposure reduction, which is my priority rather than health effects, just because I think it's simpler and cleaner to measure that.

CHAIRPERSON SCHWARZMAN: I wanted to raise another point in the -- under the category of population characteristics, because so far we've been talking about communities that I think, in a way, we're generally defining as the AB 617 community.

But going back to our questions around occupation in both the CARE-LA 1-NP results and the EBDEP results, I would be very curious to think about an occupational diesel exposure study, even an occupational intervention oriented occupational diesel exposure study under this umbrella, since we're able to tell so little from the other studies about occupational exposures and what might reduce them, and because those exposures are so high when you compare them to the general community levels. They're really, really high.

MS. HOOVER: This is Sara. Just to clarify what you're saying. Are you talking about a nested study within an AB 617 community, because, you know, this is AB 617 focused studies?

CHAIRPERSON SCHWARZMAN: Yes.

MS. HOOVER: Okay.

CHAIRPERSON SCHWARZMAN: Yes. So like take three of the facilities within an AB 617 community and look at the workers there. And they may not be they're community members in that they work in a facility in that area, but they may not live in that area. They don't necessarily live adjacent to the facility, right. But looking at facilities, not just the surrounding communities. I'm thinking of that as an exposure source for the workers there.

I don't know how that -- I would be curious to hear from people who have been at many, many of these community meetings whether the primary concern is fenceline communities, and that's what's motivating -- and it would be unsatisfying to them or is there a significant appetite for understanding and hopefully protecting the workers in those facilities.

MS. ARIAS: This is Heather Arias from CARB. I would say that, yes, overwhelmingly, it's about the residents. It is not about the workers. Not to say that folks are not concerned about those that are coming in and working in the community. But we are hearing at the community meetings is an overwhelming concern about the residents, even more overwhelming concern about the children. One hundred percent every single community, number one priority is the children and the schools.

PANEL MEMBER HOH: I think just to answer the question, I thought -- I was just curious about the community -- I mean, I think my question was already answered, because the community really wanted the children's exposure and they were very concerned.

I'd like to hear that, you know, what -- what about the community's interest participating biomonitoring study. Is that something they expressed that?

MS. ARIAS: At this point, nobody has brought up

biomonitoring specifically. There are a lot of requests about just general health studies, and what's happening in the community, and really the desire to understand how the actions that the agencies are taking are going to impact the health around them.

We've obviously talked a lot about -- Dr. Balmes is on our -- on our Board, and he is chairing the consultation group, and has led the conversations about this. And as you guys are all very familiar with, that is not even remotely an easy question to answer, because of all the variabilities that impact that.

So they don't get into the specifics of what kind of -- they do talk a lot about surveys, you know. And I think that's just more because of the more immediacy of the information for them. But there's just, in general, a real concern about their health and they know it. They don't want to be studied to be studied. They say that all the time. Don't study us to be studied. We know.

Our family members are sick. We already know it. They're here all the time. You know, they're -- we live right next to this refinery, we live right next to this road that's coming in, we live right next to this railroad, we know it's making us sick. Stop studying us. Do something about it.

But what they want to know is which actions are

actually helping. I think that's really probably the bigger question that's being asked. And, you know, it's more about those that are living there, not necessarily about those that are there to work.

CHAIRPERSON SCHWARZMAN: Just reflect on that for a second, that point towards -- a point that's again toward intervention studies. That sounds like that would align with community priorities. And I also just want to -- you know, having started by raising the issue of children's -- impact on children in a community and that it was brought up how hard recruitment was for EBDEP, and yet, I would argue there is a very different situation, because there's already such a mobilized community that's organized and has been -- there's been so much community building around it already, that perhaps that helps.

MS. ARIAS: Right. And we've talked with the staff at OEHHA a little bit about some of the opportunities of once the communities are selected for this, we can have conversations with the air districts. We can have conversations with the steering committees themselves. Many of the steering committees have very active community based organizations that -- you know, it's one of those things where we can come in and say, look, OEHHA is willing to help. Answer these questions. So you guys need to help us with bringing in the folks

that are actually going to participate.

CHAIRPERSON SCHWARZMAN: Duyen, were you going to add?

MS. KAUFFMAN: Yes. Duyen Kauffman, OEHHA.

I -- since I do wear my Biomonitoring hat when I'm doing, you know, activities for EBDEP, community engagement and recruitment, and also attending community steering committee meetings, there is a fair amount of interest. I mean, I'm sort of putting my agenda out there as a Biomonitoring California staff person. But people say, yeah, do me. Oh, I don't have kids. Can you keep me on a list for the future. And, you know, I've heard of the CARE study, which is, you know, a long process before we get to the Bay Area.

So people -- there is -- I do find that there has been interest. And I think we can leverage some of our relationships and contacts. And I think some people are just surprised that you could measure things in people. And people obviously -- you know, it makes it very personal and some people think, well, you know, maybe I don't want to know, but I would participate.

So I find there is a willingness, if people know that that's an option, that it's even a thing that exists in the world, biomonitoring. So I think with the experience we have, we can -- we -- it's not -- without

such a complicated study design, I think it's definitely achievable to get community participation and interest in the numbers that we need for what we're planning here, so...

MS. ARIAS: If I can add on real fast. I would say the one -- if I could offer any advice to the group as a whole, is I would definitely go in with your making sure you're asking the community what they would want out of the biomonitoring. That was probably, you know, the biggest lesson that has been hammered into us over the last two years is stop coming in and telling us what we want, ask us what we want.

So, I mean, it's great to have this conversation today, especially to help you guys maybe narrow down where you want to go. But then after that, I would strongly advise that you go in mind wide open and really ask the community what do they want and be willing to adjust accordingly.

MS. KAUFFMAN: Definitely.

MS. HOOVER: Yeah. We tried to really emphasize that in Duyen's slides and what we've put out there. This is just the first conversation and we're planning to do facilitated workshops in communities and definitely very open to community input today, by email, any time. So, yeah.

CHAIRPERSON SCHWARZMAN: But to reflect on the Duyen's experience of hearing that people are surprised you can even measure these exposures in people, it makes sense to go in with some information about what's possible and ask the community, of what's possible, what would you -- what are you priorities? What do you want? Because it's -- people at least have a -- there's more widespread understanding of air monitoring.

MS. KAUFFMAN: Yeah, there are also workers that -- workers that said, oh, yeah, I used to get monitored for lead. I worked at a foundry. They'd say you can't do this job for a while. Take a break. Do something else. So, you know, some people, yes. But -- but it is a fairly new concept.

MS. HOOVER: I have a question for Duyen that -- to tag on something Meg said. We were in an engaged active community. That's where we were recruiting, like, for example, in West Oakland. So I wondered if you could say a little bit more, because you alluded to our complicated study design, but, you know, I think that we actually did have trouble finding families to recruit. But could you -- so could you say more about like what your vision would be with a different study design that you think could potentially overcome some of the problems that we face? I'm just interested to hear what your

thoughts are on that.

MS. KAUFFMAN: Oh. Okay. Gosh. So, I mean, the daily samples were actually less of challenge than we thought they would be. People, said sure. Yeah, why not? I'm doing it anyway. So -- but, you know, logistically for -- you know, providing people with fridges, things like that, I think is a challenge. But if that's -- if we see really interesting results from the data samples, we can -- we will definitely consider doing that.

I think the child-parent pairs are also -- also complicated. I feel like we could do like day care centers and schools we had a lot of interest. Spanish speaking, definitely we have to consider that for these communities.

And what else?

I think just sort of the -- you know, the fire happened during the tail end of our field work. So I think people's awareness of air quality and, you know, we saw more air filter usage in homes and things. So I think, you know, particularly with air quality now, just the awareness is so high, that there would be even more interest than there was when we were finishing up our recruitment.

DR. BRADMAN: I mean, one factor in our study, you know, we usually give a gift certificate or some sort

of, you know, reimbursement for time and effort. And with State funds we weren't allowed to do this, so I was able to scrape up some money from kind of my slush funds from honorariums, and stuff, and some other sources. So we did give a small incentive gift certificate to participants.

But given the level of commitment, of course, you don't want incentives to be coercive. But it certainly could have been higher, and it would have been responsive to the level of commitment the families made.

MS. KAUFFMAN: So it was $80 for a regular sampler and then $100 total for daily samplers.

CHAIRPERSON SCHWARZMAN: There's a comment or question here.

MS. BOLSTAD: Hi. Heather Bolstad, OEHHA.

I just wondering if other matrices could be considered, like hair or teeth? It could be collected quickly, less invasively. And you can maybe enroll the children and could collect their teeth as they fall out over time, because they wouldn't need to be frozen at minus 80, I would assume. They'd probably be more relevant for the metals than VOCs, but just an idea.

MS. KAUFFMAN: Yeah. Urine was a surprisingly -- that wasn't -- there wasn't the huge barrier with urine. I think blood would be much more compicated and a harder sell.

MS. HOOVER: Did someone pipe up about -- did you say something?

So we've looked at -- you know, very early on in the Program, we looked at a wide range of matrices, and blood and urine was what we settled on, so -- I -- and I think there -- I personally know of a lot of problems with hair biomonitoring, significant confounding. I think you looked into teeth at one point, right? Did you want to make a comment on those?

DR. BRADMAN: I mean, teeth is complicated. We've collected teeth as part of the CHAMACOS study. And, you know, you can use teeth to monitor, particularly for metals. You know, we worked with somebody who is now at Mount Sinai and did really fancy, you know, slicing the teeth, and then using laser ablation, ICP-MS and getting very fine resolution across the -- kind of the geometry of the tooth surface. That's really sophisticated work.

And it does provide information about exposure, particularly the metals. There are people who are doing work to try to measure other environmental chemicals in teeth, especially persistent pollutants. But there's some evidence that other things that if they have some persistence they may get into soft tissue. The dentin layers can hold chemicals.

But, you know, in terms of validating how to

interpret it and how to compare it to other studies, you know, I think it's really -- it's very academic at this point and it would be hard to use for a monitoring program.

DR. SHE: Jianwen She. I think also the hair, we did some studies. Might not be for the VOC metabolite. If we do monitor the VOC to try to couple with air reduction activities, I do not think the hair we addressed at issue. But the people do use hair to monitor the like organic mercury, these kind of chemicals, to avoid contamination. Whether to use for VOC metabolite, maybe urine or blood still the best one.

CHAIRPERSON SCHWARZMAN: Jenny had a comment.

PANEL MEMBER QUINTANA: This is more of a brainstorming -- brainstorming idea, but what about having kind of a request for proposals from communities where people could go to the AB 617 monthly meetings and say here's what the capabilities of California Biomonitoring are. And to you community groups -- any community groups that want to think about helping to participate and having them decide if they want to do it and come to California Biomonitoring with an idea. That could have -- so it comes already from the community to start the process.

Because we did that -- or you guys did that some years ago. Are there researchers with existing

biorepositories that want to collaborate? But it could be something similar, just -- so the communities could come forward, if they thought that was something their community wanted.

CHAIRPERSON SCHWARZMAN: One reason I wanted to look at the list of the interventions that are happening in each community is I wanted to see the commonalities among the communities. Because along these lines, if -- what Jenny is saying, if Biomonitoring is going to go out to the community and say these are sort of a range of our capacities, it would be helpful.

I think it would much more streamlined if there was one type of intervention that was common among many communities that you could design a study around, rather than having to design boutique studies for each community that you were studying. Which isn't to say you couldn't do some particular studies of interest to a community, but -- anyway, I was kind of interested in thinking about tracking -- looking at what the interventions are and thinking about a study that would assess that intervention, if there's sort of a suite of interventions that are common among many of the communities.

Maybe Heather can reflect on whether there are.

MS. SCODEL: Hi. I'm Anna Scodel. I work for Heather at CARB and we were having a little discussion to

respond to that.

I think -- I mean, I think what's challenging across the Board in an AB 617 context is that, as you saw, there's a lot of strategies in each of those plans. It's going to be really hard to kind of disentangle different things that might all be happening simultaneously, if you want to try to attribute some change in exposure to some particular strategy versus kind of the whole suite.

But I think there's a few things. There's statewide measures that CARB is going to be doing that we'll apply sort of equally across the board. Obviously, it depends on what sources are in the community, but the regulations will all come into effect at the same time. So that could be useful.

And then the other thing that I was thinking of is, several of the communities have strategies around truck routing. And so that could be one where that's something -- if the city does implement it, you know, you could see a before and after where truck routes change.

Maybe?

I think, yeah, school filtration -- air filtration is another one that I think is pretty common. Again, it's -- I think it would be really hard to know in advance when something is going to be implemented and when that change is going to happen in a way that you could

align with a biomonitoring study. I think that's going to be the challenge.

MS. ARIAS: Yeah. And then I think that the other -- the other challenge is, quite honestly, the other sources that we're talking about from a community scale. Mobile sources, of course, are going to be in everything. And, of course, it's the one thing that you can look at statewide, because they're mobile sources and they're moving everywhere.

But that's not what's always impacting these communities. When we're talking about a community scale impact, we're not talking about regional, like mobile sources. We're talking about community scale impacts. That could be some of these refineries. That could be a rendering plant. That could be gas stations. That could be burning.

That is -- unfortunately, that is the challenge of the program, right? We're talking about very granular data, very granular focus, and you -- they're so unique across the state, that if you're trying to find something that's -- that is the same, that's mobile sources, and we're on it.

(Laughter.)

MS. ARIAS: We're trying to get everything to zero. We're working on that.

(Laughter.)

MS. ARIAS: I think it would be more helpful for our side if we knew what other sources, quite honestly, were impacting these communities that we don't realize are impacting them.

So I really like Jenny's idea of going to the communities and asking them who's willing to do this? You know, who's willing to be a pilot for you guys? Because, as you mentioned, you know, this isn't a lot of money really to start this, and who's willing to put in the man hours to help you, as far as -- because some of these organizations are great about getting volunteers.

And if they're willing to come forward, like Jenny is saying, and saying, yeah, we're willing to do that. You know, EHC in San Diego, they're one that is extremely active. Diane Takvorian is on our Board. And she is a huge community activist. I could definitely see them being a community that would be interested.

But I don't -- I mean, no offense, but we know that mobile sources is an issue and we know it's something statewide. We're working on it.

I think it's the other questions of what's in each of these communities. Especially from my side from a policy standpoint, I want to understand what we don't know. That's where I'm real interested in understanding.

How can biomonitoring help us to figure out what is truly impacting these children and these other sensitive receptors, so from a policy standpoint we know what regs to push forward.

CHAIRPERSON SCHWARZMAN: Well, that really raises the issue to me of having -- we've talked about kind of an intervention study happening longitudinally within the same community, but it raises the issue of sort of a control group that's not in that community to capture the impacts of whatever statewide regulations are coming on board -- regulations are not, other changes, incentives, or whatever they are to affect mobile sources statewide.

And for that, you also have to have the baseline, because those change -- because of all the factors that affect everywhere. But it -- it raises the possibility, which we haven't really talked about yet, but I'm sure the Program has considered already is like are you only studying the 617 community or are you comparing it to another community, and if so -- or some other comparison group and how do you choose that comparison group?

And it seems like that could -- if possible, that could be really helpful to help with what Heather is asking for, which is understanding insight into the sources that you don't understand yet or understanding the impact of the -- teasing out the difference of what's

happening in that community from changes statewide over time.

MS. KAUFFMAN: So attending Richmond/San Pablo meetings regularly and going to other community air monitoring workshops and things, I do hear a lot about refineries, so Vallejo, and Benicia, and Crockett, and Richmond, San Pablo, and Wilmington has got refineries. So I could probably look this up, but maybe you know off the top of your head how many of the ten communities have refineries?

Only two. Okay. Okay. Those two. Okay. Great.

MS. ARIAS: But we are interested.

MS. HOOVER: Let's see, I wanted to -- I'm going to ask you guys a question, but first I'm going to -- I just need to set some context, which is we have three years of funding. The scale of funding for that three years is an EBDEP, so that's three EBDEPs. It's very small. So we have to be really strategic about the design to maximize the kind of information we can get from it.

I did already mention that we're not restricted to 617 communities. But realistically, we have to focus our design and be really clever about how we carry that out.

With regard to what we don't know, I think I'm

going to venture a guess that the kinds of biomonitoring that we can do won't answer that question. That's why we raised the concept of maybe some non-targeted analyses. We're really interested in non-targeted analyses to look for things that have not been previously measured.

Now, non-targeted analyses have their own set of problems, very challenging. But years ago, when I was a consultant in Canada, I was involved in a really interesting study where we did non-targeted analyses of indoor air samples. And we did an open scan and we looked at all the VOCs in an office building where the workers felt like it was a sick -- sick building syndrome and they had a previous electronics manufacturing facility on the site. So they were afraid that there were, you know, remaining contamination.

And so I was tasked with identifying every VOC in the sample. And the most significant -- and so it -- it was a useful and interesting study. The most significant chemicals in those samples were fragrances, so they were personal care products.

So that -- it was actually very informative for the people in that building. This isn't exactly relevant to those kinds of contaminants we're talking about today. But I do think that a promising way would be, you know, targeting certain areas in certain communities and trying

to look, you know, at an open scan of VOCs. Like that's a complementary study that we could consider.

I'm also really interested -- you know, I agree with you, I think there's incredible awareness on mobile sources. CARB is doing an amazing job. You know, we showed that in our gasoline report, like how phenomenal California is doing with that.

So in terms of the other more specific sources in the communities, are you concerned -- so I -- so Marley in my group has been looking at the contaminants of concern named across the communities. And they seem to be very similar, you know, VOCs, PAHs, diesel PM, some metals. Have you heard about anything that doesn't fall into that cate -- pesticides, sorry -- anything -- anything outside the usual set of air pollutants, we'd be interested in that.

I'm also interested to hear more about -- and I think I did ask this in a -- one of our meetings. But if you can just say something more about metals, like -- I'm -- metals would be something we can measure very well in biomonitoring. But I'm interested to know more about the significance of metals as contaminants in these communities.

MS. ARIAS: Yeah. I don't know off the top of my head any other of the toxics. Most of the data that

you're looking at is the stuff that we put together with our inventory. Acknowledging that our reporting reg that's going to come into play is going to wind up really shoring up a lot of those data sets on a more frequent basis. So, you know, that's something though that's a few years down the line. Hopefully, those data sets will really help us to be able to hone in more on these granular concerns.

As far as metals, you know, there -- there's -- southeast L.A., in particular, with the industrial sources there, that has come up a few times. They haven't -- because we haven't actually gone there yet, not sure what the community is going to discuss. So don't know if there will be anything beyond the traditional chrome plating and things that folks are already concerned about. But I'm trying think if you guys recall anything else from metals?

MR. MOORE: What was interesting, looking at the community scale, we saw like crematoriums were huge sources of some metals that was -- we were kind of surprised. I can actually get that to you with one of the -- we have source level information, so I can get -- I can get that list to you.

It was surprising. Like, whoa, there's a -- there's a cat -- you know, a pet crematorium that was putting out a bunch of metals. So that was interesting

when you look at that granular scale, those like individual facilities kind of pop out, that you don't see when we do our like regional analysis.

CHAIRPERSON SCHWARZMAN: Are those data coming from the Hot Spots Program?

MR. MOORE: I believe some is. Our Planning Division has really taken these community boundaries, and where historically we lump -- like gas stations, there's so many of them, that went from like area-wide sources we call them. Because that works for regional analysis. But when you're going to community, they're trying to like take those area sources and like resolve them out. You know, so it came from our Planning Division. And I -- they may have grabbed some information from the Hot Spots. And then our CTR too, we have our stationary reporting that we get every four years from local air districts, which will happen annually, I believe, now with the new reporting reg. So that's going to help us quite a bit.

MS. ARIAS: Yeah. And I think that it will just be interesting when you talk to the communities to see what they highlight for you or they think is a concern. And then that might help you be able to figure out then what you could focus on.

MS. SCODEL: I just want to echo the concept of kind of this screening to figure out what might be

impacting the community that maybe we don't know about, I think is pretty well aligned with some of the way that the communities have been approaching the air monitoring side.

So there's often kind of this question of, you know, part of the whole motivation behind AB 617, which Brian was just talking about, was this moving from looking regionally to kind of what's going in this particular community that maybe we don't have as good of an understanding of, and things that might not matter at a regional scale, but that really, really matter to people who live near them or who, you know, work near them or all those things.

And so I think keeping that idea of screening, and I don't know sort of the technical capacity associated with that, but, you know, keeping that on that menu of options I think aligns really well with some of the approaches that we've seen with the air monitoring to let's kind of look around the community and see if there's pollutants that we didn't know about that maybe our inventory gave us an idea might be there, but we need to understand a little bit better, or maybe there's hot spots. I think that we -- thinking about ways that biomonitoring could complement kind of approach, you know, I think that should definitely be on the menu of options, and you take it to the community is because I think that's

very consistent with the way that they've been starting approach them -- the air monitoring. So ways that those could complement each other I think would be really nice to think about.

CHAIRPERSON SCHWARZMAN: I wanted to ask Oliver who's our resident expert on non-targeted screening to weigh in on this, because it's something that Sara had raised earlier among our sort of menu of options, things to think about.

In the setting of AB 617 communities and the air monitoring, what we -- what comes to mind for you about doing non-targeted screening and potentially identifying previously unappreciated sources of pollution and that kind of thing.

PANEL MEMBER FIEHN: Yes. So first of all, air monitoring is more feasible in a way for untargeted screening, because it's been done for many years. So many compounds that are volatile are known, and techniques are available.

Secondly, new informatics techniques have been developed, such as hybrid search and other types of classifications that can deal with the number of mass spectra to sort them to chemical classes. So there is a much better way today to deal with these types of classifications to at least -- you know, for these

unknowns at least say that these are polyaromatics, or aliphatics, or, you know, other types of classes so that, you know, one can deal with that amount of information, at least get some idea of how to -- of whether to be concerned or not.

And thirdly, of course, other informatic tools are also getting better in terms of enumerating and storing that information. You know, we have developed techniques, but others have too. So all that is much better suited for air monitoring than for blood or urine, because basically the exposome is more limited and cleaner.

CHAIRPERSON SCHWARZMAN: But then for the Program, you know, then that's back into environmental monitoring, not biomonitoring. So do you have any reflections on that?

MS. HOOVER: Yeah. This is Sara.

That's why I put that in complementary. That was intentional, because I'm aware of what Oliver is saying, and just our own experience with doing -- within the Program, we're actually doing semi-targeted screening, because of how you have to prep, you know, the biological samples. So I am talking about non-targeted screening of air samples specifically, because I think -- yeah, that's a lot more doable and could yield some really interesting

results. That would be a complementary study funded with, you know, salary savings that I currently have -- so those are the kinds of things that we can think about adding as add-ons really.

PANEL MEMBER HOH: Echoing that the air samples -- environmental samples are much better for the non-targeted analysis. And then it's much easier to actually identify what they are.

Another thing is that I was thinking the community -- it's kind of compelling. I go -- I hear from my other folks, like the Imperial Valley community, you know, people go there. Their -- the communities are super, super concerned about their environmental pollution there, you know. So it really makes sense that they're concerned about their health outcomes.

But if we do the interventions, you know, if they're interested in more intervention, we need to know the baseline and then the intervention -- we have to evaluate the -- how the intervention works or not, right?

So the biomonitoring has to be kind of involved, you know, with the -- with AB 617, you know, the -- we can -- we can probably check the air monitoring data that, oh, yes, we were able to reduce it, but is it really happening to -- in terms of the exposure? Actually, it's really happening or not.

Maybe outdoor air -- maybe reduction of the pollution may work. But indoor or other routes of the exposure could be much bigger than, you know, the air pollution. You know, so something that has to be addressed.

CHAIRPERSON SCHWARZMAN: Jenny.

PANEL MEMBER QUINTANA: So I just want to clarify, the Program is willing to look at house dust or air samples for non-targeted, is that what you're saying? Because I think that -- I wouldn't recommend doing non-targeted and biological, not just for technical reasons for our two experts there, but you're going to find all kinds of stuff. You don't want to find like drugs of use in the sample. And that's by the nature of the analysis. It's not a good place to start with communities I think.

But I guess just to get to your point as well, house dust -- if communities are willing to provide vacuum bag samples, or a lot of people don't have vacuums, even sweep it up, or whatever, you know, if they were willing to provide those samples, that would reduce a lot of the cost which is collection, they could again come forward, not just with biological samples to propose, but, you know, house dust samples is a very interesting matrix to look at. It might be interesting.

But just -- my last thing, I promise. But I think we should focus on either pesticides or diesel. I think pesticide exposure Imperial Valley, Central Valley, other places is -- the expertise this Program has, it hasn't been studied as much. And I think it's an obvious place in terms of -- I think you were saying we offer -- or, you know, focus our request in some way. That would be one. Diesel you've talked about a lot anti-idling. Rerouting of trucks is an obvious one. But pesticides would be the other, is exposure occurring by demonstrating, by it's getting into people's bodies. Sorry. That's a long comment, but go ahead.

MS. HOOVER: Yeah. I just wanted to make sure I'm hearing all of your point here. So first of all, just to clarify, this -- our new AB 617 program is within OEHHA and it has aspects beyond biomonitoring. So we have our targeted biomonitoring studies that we will run in compliance with the law that governs Biomonitoring California.

But we have aspects that are OEHHA aspects. So it's not the Program that is doing environmental samples, it's OEHHA that will do complementary studies of environmental samples. So, yes, definitely. And as I -- that's why we brought it up and that's why we put non-targeted as complementary, because we're very aware of

the difficulties that you raise, which actually we're going to touch on that in my next presentation about non-targeted screening.

I have a question for you, which is pesticides, do you have any suggestions about being more specific? Because pesticides, you know, very large category. So do you have any information about specific pesticides that are -- that -- I mean, there's many that are biomonitorable, but thoughts on that.

And the other question I just wanted to pose more broadly that we touched on, which is biomarkers of effect. If people have suggestions on -- like I said, we're researching that. You know, potentially interesting feasible biomarkers of effect linked to air pollution, if -- just if anyone has thoughts on that.

PANEL MEMBER QUINTANA: I think José should be answering the question on pesticides. But I was thinking of -- more specifically of agricultural applications in the pesticide use database, rather than veterinary pesticides or something like that.

PANEL MEMBER SUÁREZ: So with pesticides, the ones that really have not been studied as much and I -- a substantial concern are fungicides. You know, I think I've brought this up before, where we know that 70 percent of all crops in the U.S. are sprayed with fungicides. And

this has really skyrocketed over the last 15 years. We know very little about that.

Some fungicide -- for a lot of the fungicides, the methods have just been recently developed. I know that Eunha has -- in her group, they have been able to start thinking about measuring some of those.

So these are novel ones that I would be particularly concerned of. And we can talk about which specific fungicides or class of fungicides. And I don't know if this is the moment to talk about that, but I'd be happy to have a discussion about that.

Of course, herbicides, we've heard a lot about glyphosate lately, which is the most commonly used insecticide worldwide, especially here driven by the U.S., primarily with crops like corn, soybeans, and whatnot. So those would be the first ones.

Of course, then we have insecticides, which you do have experience measuring a lot of the different insecticides. And things are changing in the insecticide world where organophosphates used to be the most commonly used insecticide. Now, the use has been decreasing, still high though, but taken over by neonicotinoids and primarily neonicotinoid and pyrethroids to some extent. So both. But I'd be happy to have more of a conversation about specific compounds or classes or whatnot.

CHAIRPERSON SCHWARZMAN: I would think, given the sort of local specificity of this Program, it would be work looking at the -- what's used in the area, right? Because some that are used in really high volumes nationwide -- like, we don't have -- we don't grow a lot of corn. For some of it, there's that big variation. We need to look at what's used.

Lauren.

DIRECTOR ZEISE: Yeah. And I would think you'd also want to consider carefully timing, so that you want to do the biomonitoring near the time that it's actually being applied.

CHAIRPERSON SCHWARZMAN: Go ahead.

DR. SHE: I have a comment about the biomonitoring of the VOC-related chemicals. So last year, we have -- last year, we have a meeting. CDC presented to monitor 28 urinary biomarkers for VOCs. So we know this VOCs we have captured that by the glutathione formed the mercapturic acid. So that can cover a few groups of the VOCs, tobacco related, dry cleaning, and refinery. So this kind of analysis might be able to be coupled with the actions the Air Resources Board try to reduce the air emissions. I do not know the 26 tons reduction. If you break down, you might identify which one is the major one contribution to the scores. You mentioned the 26, that's

the ones we know. We might even to refine our method. EHLB laboratory has developed a VOC method.

So next one I have a comment about untargeted analysis. So we have the two experts here. We know untargeted analysis is for discovery purpose. We need to look for the cross work between the untargeted and the targeted analysis. Most of the time we use untargeted only of the discovery what will become targeted analysis.

Because untargeted analysis has -- in contrast to it's advantage, it covered more unlimited chemicals theoretically. But on the other hand, you have low weight quantity, because you do not have a standard entity in them. So these are two things need to be shared together to work, so they are not against each other or replace each other. They complement each other.

CHAIRPERSON SCHWARZMAN: Yeah, there is another over here. I thought you were responding. Sorry.

MS. BUERMEYER: Nancy Buermeyer -- excuse me -- with the Breast Cancer Prevention Partners.

Just a couple of quick comments about mostly working with communities. We just did a project where we went to 11 different communities around the state and did, what we referred to, as listening sessions, which is probably no different than working groups or workshops, but it just communicated in calling what it was, which is

to listen to the community.

And we did present information on a series of different breast cancer risk factors, whether it was light at night, or chemical exposures from consumer products, or place based, or social and built environment. And then heard from the community what of these resonate with you and what do you think we should be focused on?

And it was amazing how appreciative people were when you actually sat down and listened to them. And I know that most of us know that and do that. But to call it what it is, I think made a difference.

In talking about pesticides, I think it's really important to understand that. But one of the things we heard consistently throughout the state was the concern people had about immigration status. And to get the folks that are most directly related -- or most directly impacted by pesticides, especially agricultural pesticide exposures, you have to overcome the overall community concern and then you have to overcome basically ICE.

Like, we heard stories of people who wouldn't walk into a health clinic if there was a black SUV sitting outside of it. Like, it was horrifying the impact not just on people who are here undocumented, but anybody who's here that looks like people that this administration is targeting. So those were just a couple of things I

wanted to add.

And the last thing I wanted to say, and I don't -- Asa had referenced not being able to use State money to reimburse people. But it was really important to us when we went into these communities that we provided some financial consideration of the time we asked them to give. These are all community groups that are completely over -- over capacity. And to not offer them some resources to compensate them for their time felt really disrespectful to us.

So I don't know how you do that in the context of the Biomonitoring Program, but I just wanted to raise it as an issue that was -- that really came up for us a lot.

MS. HOOVER: We actually have a couple comments that came in online. And so before we -- we're about three minutes to go in this session, so I want to make sure we cover those.

This is from Jo Kay Ghosh from AQMD, I guess. South Coast.

Thank you.

Okay. The first question is given that the AB 617 Program is structured to provide long-term emissions reductions, is the biomonitoring approach able to show changes in long-term population exposures? I'm thinking about the short-term temporal var -- temporal variability

within subject variability that was shown in the previous presentations. So this seems like it would be a challenge.

And I was just chatting with Kathleen about this, and basically we agree. And this is obviously a concern that we'll be keeping in mind as we design our biomonitoring studies.

The second question -- follow-up question. Also knowing that these are all environmental justice communities that experience many simultaneous factors that are impacting their health, have you considered including some health education and/or support, e.g., linkage to care, as part of these studies? This may help overcome the barrier of not wanting "just to study" and wanting actions that will lead to improved health outcomes. One example is that some studies have found that many families with kids with asthma were not clear on how or when to use their medication.

So I will say that all of our biomonitoring studies are paired with health education. That's one of our goals is to provide possible ways to reduce exposures and actually stay engaged with the communities. That's one thing we're going to be doing in EBDEP is to stay engaged with communities, trying to work with communities directly. So that will definitely be an element of the AB

617 studies.

And Duyen, did you want to add anything else about health education or engagement related to AB 617?

MS. KAUFFMAN: Nothing.

MS. HOOVER: Okay.

CHAIRPERSON SCHWARZMAN: Anything else from online?

MS. HOOVER: So that is all from online.

CHAIRPERSON SCHWARZMAN: Okay. In that case, thank you all for your contributions to this rich discussion and thank you to the ARB staff.

MS. ARIAS: Thank you.

CHAIRPERSON SCHWARZMAN: Not only for all your work, but for coming here to discuss it with us. It's really exciting.

I will introduce the person who barely needs introduction. Sara Hoover is Chief of the Safer Alternatives Assessment and Biomonitoring Section in OEHHA. And she is going to give a brief presentation now about possible topics for 2020 SGP meetings. And then we have a little bit of time for question and discussion before our final open public comment public period at 4:15.

MS. HOOVER: Okay. Thank you. So I'm pleased to announce that we managed to, after polling our Panel

members repeatedly, we have set our dates for 2020. March 4th in Sacramento, July 14th in Oakland, and November 12th in Oakland.

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MS. HOOVER: So this time in terms of the topics, I'm actually tying them to each meeting. And we've been thinking about themes for the next three meetings. At every meeting, we'll have the usual Program update. So we'll be hearing updates about analyses related to CARE, about follow-up on EBDEP, and about our AB 617 planning. So we'll be talking about those probably at each meeting next year.

The Panel recommended, based on the preliminary screen, that we proceed with developing a potential designated chemical document on quaternary ammonium compounds. And we're going to do that and we've scheduled that for March. We're also looking for -- we're going to be inviting a guest speaker or guest speakers to talk about the analytical issues involved in QACs. And then Shoba will be doing the OEHHA presentation on the document that we'll be preparing.

So to pair with QACs, we're thinking about maybe other consumer product topics. One thing that was suggested was PFASs in food packaging. So if anyone has any thoughts about either consumer product topics or

anything maybe linked to QACs, that could be a potential March topic.

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MS. HOOVER: With regard to the July meeting, the idea that we've had for this is to actually do more of a theme around non-targeted screening. We've had many meetings where we check in on non-targeted screening. It seems relevant for a bunch of reasons to do that again. We would provide an update on current Biomonitoring California activities. We would be inviting a U.S. EPA guest speaker. And I actually did reach out to Jon Sobus and he is available for July, so that's promising.

And then I wanted to mention what Oliver has raised in the past about -- and it came up again today about the ethical issues in non-targeted screening and results return, specifically around biomonitoring.

Now, I am very interested to hear about who might be able to be a guest speaker on that kind of topic. So if anyone was thoughts on specific people to invite, that would be great.

--o0o--

MS. HOOVER: With regard to the November meeting, we're going to be touching back in on biomonitoring surveillance in California. So we would again do a more of a focus on the CARE study, with the latest results by

then. Nerissa and I have also been talking about having a guest talk to go into more detail about constructing a representative sample. And then discussion of next steps for the CARE study, you know, in view of limited resources.

Then we'd circle back on AB 617 and go into more depth, reporting back on what we will be doing next year. And then as always, we'll be looking at possible topics for 2021.

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MS. HOOVER: So with that, I would -- there's time to give feedback here in the meeting and both Panel member and the public are welcome to propose additional topics or comment on these topics to the Biomonitoring email.

CHAIRPERSON SCHWARZMAN: Jenny.

PANEL MEMBER QUINTANA: I was just circling back to a topic I raised a few years ago, which was initially when the Biomonitoring Program started it had a -- very much came from breast cancer activists. And I felt like that had not been as forward in discussions recently. I think I had sent you that paper Rudel et al. about chemicals to biomonitor related to breast cancer risk. And I just had a response from you with a few chemicals you had looked into. And I would just like to propose

that maybe as a future topic to follow up on that.

CHAIRPERSON SCHWARZMAN: I was in a group recently that was discussing a point that we are all completely naive about, which is, is there anyway to biomonitor for exposure to -- to microplastics? And is there any literature, does anyone know anything about biomonitoring from microplastic exposure?

And it might be that staff does a literature review and the answer is no, but we were all ignorant of that.

MS. HOOVER: I think it's great topic actually. I don't know. Is anybody in the room, has anybody looked into it? It's very interesting and important, I think.

DR. WALDMAN: This is Jed Waldman of the Environmental Health Lab. Our laboratory is looking at microplastics from an environmental point of view. But we've been partnering with the U.S. EPA to look at them in fish -- in sediments, water, and fish. So we've developed methods that, you know, are quite invasive for humans, but they are -- we're trying to identify ways to bioassay -- it might be better to call it a bioassay at this point.

But there are -- there are -- we're using microspectroscopic means.

CHAIRPERSON SCHWARZMAN: There's so little known about the health impacts of microplastic exposure. And it

seems like one of the ways into that -- I mean, is understanding something about exposure. And I think at least the little that I know about it, there's a complicating issue of the health effects of any microplastic exposure from the perspective of the material. And then there's health effects of the -- what adheres, absorbs to the microplastic, right? So it seems like a very -- potentially a very complicated biomonitoring question.

Eunha had something to add.

PANEL MEMBER HOH: I did some -- I did quite a lot of work of the microplastics, more like environmental samples and toxicity studies in fish. But there are quite a lot of datas are emerging. I think it's very worthwhile to check what is the current status. You know, all the emerging information about -- there are the studies like how much we are exposed to right now, you know, through the food consumption.

You know, so -- but like health outcomes, their animal models are, you know, found some toxicity, some biologic activity. So I think it's very important to know that -- what we know so far. I think it's an important issue. Yeah.

CHAIRPERSON SCHWARZMAN: There must be something based on the study in biota -- the available evidence in

biota about what matrices it gets into.

PANEL MEMBER HOH: It's so complicated that as the chemicals are kind of leaching out and then we're exposed to chemicals. But at the same time, the particles themselves are toxic too. You know, so there are -- quite of now, the -- actually the nice thing is that the experts from the nanoparticles, those people are now coming into this field, which I think is very, very good, you know, because it's -- it's a very complex mixture of the chemicals and physical matter and very tiny, tiny particles, so...

CHAIRPERSON SCHWARZMAN: There was that report that came some time in 2019 I think about the ubiquity Of microplastics in drinking water. And there was very little that anyone could say about the importance of that and whether --

PANEL MEMBER HOH: Exactly. And even the RT -- the air and rain, all kind of microplastics, it's just emerging all the data, yes.

MS. HOOVER: Do either of you have suggestions on a guest speaker, because that would be the most practical way to tackle that?

PANEL MEMBER HOH: Definitely, I know one.

MS. HOOVER: Fantastic. Can you send me an email?

PANEL MEMBER HOH: Yes. Yes.

DR. BRADMAN: I'll just say a couple of brief things. There's actually a symposium on microplastics just a few weeks ago, put in by -- put on by the San Francisco Estuary Institute. And I don't know if you know those folks, but it might be worth talking to some of them. They had -- were reporting on measurements in the San Francisco Bay and had a lot of information about types of microplastic particles and where they're from. And I'm just going to put a personal note out there. This is something I really want to work on.

(Laughter.)

DR. BRADMAN: So if anyone, you know, is addressing this issue would like to look for collaboration, I'd be happy to help.

(Laughter.)

CHAIRPERSON SCHWARZMAN: That's powerful coming from Asa given how much he's already working on.

(Laughter.)

CHAIRPERSON SCHWARZMAN: I'm personally shocked.

(Laughter.)

CHAIRPERSON SCHWARZMAN: Other topics that might be of interest for 2020, knowing that this conversation doesn't end here?

Eunha.

PANEL MEMBER HOH: I didn't talk about it, but I want to just chime again the wildfire. It's something that I'm -- it's just getting crazy, and especially so important for Californians. So it's something that -- even though there's not data. It's very -- maybe thin, but I think it's nice to -- there some kind of projects I think were supported by NIEHS, the kind rapid response funding mechanisms. So I think there is some projects were done.

MS. CHRISTENSEN: You know, I just want to jump in, and speaking on be behalf of Nerissa, who would probably answer this question better, we are looking into some of the rapid response funding and looking into how biomonitoring can be worked into that.

It's not something we're taking on in this current funding cycle. We're looking to one of the next funding cycles. But they have several throughout the year. So yes, we will be looking into essentially taking what we were doing -- we had planned on doing for CDC and our CDC proposal, making a few adjustments, and then seeing how that might play out in California in our response to wildfire.

CHAIRPERSON SCHWARZMAN: And am I right to think that your thoughts around that, as a program, include occupational exposures?

MS. CHRISTENSEN: Yes. Very much. Very much.

CHAIRPERSON SCHWARZMAN: In our most recent event, I read somewhere about people who were evacuated from fire zones and that some of the vineyards were bringing buses to the shelters to pick up their workers to go work in the vineyards. It was striking to me.

Nancy.

MS. BUERMEYER: Just related to the wildfire -- Nancy with Breast Cancer Prevention Partners -- there's not only the workers around the firefighters, and I know there are some studies being done around firefighters, I think funded by the California Breast Cancer Research Program, CBCRP, but also there's been a lot of talk about the people who come and do the cleanup. So like the day laborers and the domestic workers who come and clean the mess that's left there. They have no protection under OSHA and they rarely, if ever, have any kind of personal protective equipment, much less training on how to do it.

So focusing on some of those populations and how do we protect them, and see what they're exposures are might be an aspect of that consideration.

CHAIRPERSON SCHWARZMAN: And California has a new requirement coming out of Cal/OSHA that I'm not super up on, but about respiratory protection for people who work outside, not specifically with like fire cleanup, but

anyone who is working outside. And understanding those exposures a little bit could be influential. It's a half formed though. I'm sorry. Have informed thought.

Other topics for 2020?

A reminder of what's on the screen that Biomonitoring is always happy to hear your thoughts about topics for 2020. And you can -- and beyond. And you can email them to biomonitoring@oehha.ca.gov.

MS. HOOVER: Let me ask just one last question. This came up earlier in the meeting, which is marijuana smoke. And I'm just interested to know the Panel's interest, because that's not a designated chemical currently. So like you, I -- we have -- you had to pick one for 2020. It's going to be QACs. But what's the level of interest in marijuana smoke or any other potential chemical to put on our list for tracking for preliminary screening?

We have the previously screened classes that we are continuing to track. But any thoughts on that? I'm always interested to hear about emerging chemicals or other things you might want us to keep on our list to track.

CHAIRPERSON SCHWARZMAN: At risk of betraying my first profession as an M.D., my bias about that, just as one comment, is not that it's not important, but that

there's so much more attention around from the health community things that will be trained on marijuana smoke. And by comparison, all other environmental exposures are -- receive so little attention that it's a role that biomonitoring can keep playing, because no one else is, as opposed to something like marijuana smoke exposure, which will be covered by other fields.

I'm happy to be disagreed with.

PANEL MEMBER QUINTANA: I brought it up earlier, but not in the context of studying it directly. But if you're measuring, you know, VOCs or PAHs, metabolites in someone's urine to ask about it as a explanation or confounder to that measurement is how I brought it up. Not just a focus area.

DIRECTOR ZEISE: This is an environmental exposure that -- related to this that I think is worth noting and possibly -- and I don't know how extensive it is, but we have gotten some inquiries from residents from air districts who are getting complaints from residents where marijuana is being cultivated. And I think there's not a lot of understanding there. And I don't know what would be monitored but it is an issue.

CHAIRPERSON SCHWARZMAN: Any other final thoughts before we move on?

Okay. Our final agenda item is an open -- a call

for open public comment from within the room and from the web. Is there anything emailed?

MS. HOOVER: Nothing emailed.

MS. BUERMEYER: Hi. Nancy Buermeyer, Breast Cancer Prevention Partners. I wanted to harken back to something that Dr. Quintana talked about this morning, which is about the funding for the Program. And the question that was raised is how do we deal with the lack of funding.

And the flip side that I want to talk about is the interest on the behalf -- on behalf of the advocates who care deeply about this Program about fixing the funding problem as opposed to having to accommodate to it.

So there is a lot of interest among a number of different organizations in going to the Governor's office and going to the State Legislature to ask for a stable general funding account for this Program, as opposed to the special accounts that you currently use.

I have no idea how successful that is going to be. But I will say, and I've talked to Dr. Schwarzman about this, having the support of this Panel, and not just the eight or ten of you, however many there are, but any of your colleagues around the state that care about this Program that are scientists who are willing to speak up and talk about the importance of this Program, we will be

working with environmental -- or health groups and environmental health organizations and environmental justice groups to try to build that support.

We're not exactly sure how it might move forward, but I just wanted to say that there is interest in that. And, you know, nothing is ever guaranteed when it comes to getting money out of the State government. But it is something that people are talking about and care deeply about. So anything you guys can do to support us around that would be much appreciated.

CHAIRPERSON SCHWARZMAN: One final call for any public comments before we adjourn?

Nothing.

Anything from the Panel or in the room?

Thank you to all our presenters from within the Program and without. It was exciting today to hear results, and the results of data analysis. And I want to acknowledge the amount of work that's behind all that, not just -- I mean, the data analysis is tremendous work, but all of the work that went into designing and conducting the story -- studies that enable to do the analysis. And it's -- it's an exciting point to get to where we actually get to see some results. And so thank you to everyone who contributed to the meeting.

And a transcript of this meeting will be posted

on the Biomonitoring California website when it's available. And the next SGP meeting, as Sara said, will be on March 6th in Sacramento. Thank you to everyone for your contributions today, and we'll adjourn the meeting.

(Thereupon the California Environmental Contaminant Biomonitoring Program, Scientific Guidance Panel meeting adjourned at 4:19 p.m.)

C E R T I F I C A T E O F R E P O R T E R

I, JAMES F. PETERS, a Certified Shorthand Reporter of the State of California, do hereby certify:

That I am a disinterested person herein; that the foregoing California Environmental Contamination Biomonitoring Program Scientific Guidance Panel meeting was reported in shorthand by me, James F. Peters, a Certified Shorthand Reporter of the State of California, and thereafter transcribed under my direction, by computer-assisted transcription.

I further certify that I am not of counsel or attorney for any of the parties to said meeting nor in any way interested in the outcome of said meeting.

IN WITNESS WHEREOF, I have hereunto set my hand this 17th day of November, 2019.

JAMES F. PETERS, CSR
Certified Shorthand Reporter
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