

MEETING
STATE OF CALIFORNIA
ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT
ENVIRONMENTAL CONTAMINANT BIOMONITORING PROGRAM
SCIENTIFIC GUIDANCE PANEL

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A P P E A R A N C E S

PANEL MEMBERS:

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

Scott Bartell, M.S., Ph.D.

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

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

Thomas McKone, Ph.D.

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

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Dr. Lauren Zeise, Acting Director

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

Ms. Frank Kammerer, Staff Attorney

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

DEPARTMENT OF PUBLIC HEALTH:

Dr. Michael J. DiBartolomeis, Chief, Exposure Assessment Section, Environmental Health Investigations Branch, Lead of Biomonitoring California

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

DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

Dr. Myrto Petreas, Chief, Environmental Chemistry Branch

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

GUEST SPEAKERS:

Vanessa Galaviz, Ph.D., M.P.H., Associate Public Health
Scientist, Office of the Secretary, California
Environmental Protection Agency

Chris Simpson, Ph.D., Professor, University of Washington

ALSO PRESENT:

Ms. Nancy Buermeyer, Breast Cancer Fund

Mr. Tom Jacob, Chemical Industry Council of California

Dr. Veena Singla, Natural Resources Defense Council

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P R O C E E D I N G S

1
2 DR. PLUMMER: All right, everyone. Let's go
3 ahead and gather for the meeting. Take your seats.

4 So I just want to make a few announcements. So
5 today's meeting is available via webcast. And so we ask
6 you to please speak directly into the microphone and
7 introduce yourself before speaking today. And this is for
8 the benefit of the people participating via the webcast
9 and also for our transcriber.

10 So the materials for today's meeting were
11 provided to SGP members, and they were also posted on the
12 Biomonitoring California website. And a small number of
13 copies of the agenda and the presentations are available
14 at the table near the entrance of the auditorium. A
15 sample SGP packet, which includes background references
16 for the morning session is also available for viewing at
17 this table.

18 Today we will take one break at 1:00 p.m. for
19 lunch for about an hour and a half, returning around 2:30,
20 2:25. The restrooms are located out the back doors and to
21 the left as you exit. And the emergency exits are located
22 to my left there, to my right there, and also out the back
23 as well.

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

1 Health Hazard Assessment. Lauren.

2 ACTING DIRECTOR ZEISE: Good morning. Good
3 morning, everyone. I'd like to welcome everyone in the
4 audience and on the web to this meeting of the Scientific
5 Guidance Panel for the California Environmental
6 Contaminant Biomonitoring Program, which we also call
7 Biomonitoring California. And I want to thank you all
8 ahead of time for your participation in this meeting.

9 I just want to take a minute or two to send good
10 wishes to Meg Schwarzman who is recovering from a very bad
11 bicycle accident. She's a member of this Panel. And I'd
12 like to let everyone known she's home. She came home on
13 Tuesday. And at the back of the table, we have a recent
14 picture of Meg celebrating her first -- her son's very
15 first birthday in the hospital, as well as the newspaper
16 article that discusses the accident. So please feel free
17 to take a look at the materials at the back of the room.

18 Meg has really made amazing progress and she
19 wants every -- she sends everyone her good wishes and she
20 wants everyone to know she'll be back. So it will be a
21 long recovery, but we're going to see Meg again fairly
22 soon, I think.

23 So at the last SGP meeting it was held in
24 Richmond on November 18th, 2015. And at that meeting, we
25 heard from representatives of the CDC and State

1 biomonitoring programs across the U.S., and discussed
2 issues of common interests, provided input on best
3 practices for returning biomonitoring results to study
4 participants during a special session on this topic. And
5 this included presentations by Dr. Rachel Morello-Frosch
6 of UC Berkeley, and Duyen Kauffman at CDPH, and an
7 in-depth discussion with the guest speakers and audience.

8 So the Panel unanimously recommended at that
9 meeting that two chemicals classes ortho-phthalates and
10 perfluoroalkyl and polyfluoroalkyl substances be added to
11 the list of priority chemicals for Biomonitoring
12 California. So more information on the November meeting
13 is available on the biomonitoring website at
14 www.biomonitoring.ca.gov.

15 And now, I'll turn the meeting over to the Chair
16 of the SGP, Dr. Asa Bradman.

17 CHAIRPERSON BRADMAN: Thank you. And thank you
18 everyone for attending today. You'll have to excuse my
19 voice is a little bit rough today. Getting over a cold
20 here, but I don't think I'm contagious.

21 So we're going to review a few things before we
22 get started. And I want to go over the goals of today's
23 meeting. We have a few different components today. I
24 think it will be a very interesting discussion this
25 morning, which will involve participating in a special

1 session on exposure to diesel exhaust, and other sources
2 of polycyclic aromatic hydrocarbons, and also to provide
3 input to the Program on next steps related to this new
4 information and where we want to go forward in addressing
5 diesel as a potential target for biomonitoring. We're
6 going to also hear laboratory and Program updates and
7 provide input. That will be most of our afternoon agenda.

8 And then just a reminder from past meetings for
9 each agenda topic, we're going to have time for Panel
10 questions and discussion. There will also be
11 opportunities for public comment and then also additional
12 public -- Panel discussion and input. And just a reminder
13 about public comments, if you'd like to make a comment on
14 an agenda item, please fill out a comment card, which can
15 be obtained from the table near entrance of the
16 auditorium. Turn the cards into the Laurel Plummer.
17 Laurel, if you could raise your hand. Thank you.

18 And for those of you who are listening to us
19 through the web, you can provide comments via email at
20 biomonitoring@oehha.ca.gov. OEHHA being O-E-H-H-A. So
21 biomonitoring@oehha.ca.gov. Emailed comments relative to
22 the topic under discussion will be read aloud during the
23 meeting.

24 As usual, public comments will be subject to time
25 limits. And if needed, the time allotted will be divided

1 equally among all the individuals wishing to speak on that
2 agenda item.

3 Please keep comments focused on the agenda topics
4 being presented and there will be an open public comment
5 period as the last item of the day. So on -- at that
6 point, you can make comments or submit questions about
7 anything relevant to the Biomonitoring Program.

8 So I want to now introduce the morning session.
9 At the November -- those of you who were there, you may
10 recall at the November 2014 meeting, the Scientific
11 Guidance Panel encouraged the Program to pursue method
12 development to measure 1-nitropyrene metabolites as
13 nonspecific urinary biomarkers for diesel exhaust
14 exposure. The Panel also discussed complementary
15 strategies to evaluate diesel exhaust exposures and
16 potential health impacts, including ambient air
17 monitoring, exposure modeling, the measurement of
18 nonspecific markers of inflammation, and genotoxicity.

19 So they've come to follow up on this. I think
20 we're going to have a really interesting discussion this
21 morning -- for this morning's session, which will review
22 recent biomonitoring findings on 1-nitropyrene metabolites
23 and other PAH metabolites in various populations, some in
24 California and some elsewhere.

25 The primary goal of the session is to discuss

1 strategies for studying communities that maybe highly
2 exposed to diesel exhaust and/or other sources of PAHs in
3 California, as well as approaches for using biomonitoring
4 to evaluate public health impacts of California's
5 regulations aimed at reducing emissions from diesel
6 sources.

7 And I think that will be a particularly
8 interesting topic for discussion today about whether we
9 can really conduct studies that can look for changes
10 related to changes in emissions.

11 As a reminder, when we talk about community in
12 terms of Biomonitoring California, a community can be
13 geographically or non-geographically based, i.e. it can
14 include a location like, for example, those living near a
15 port or an occupational population. We'll first hear
16 presentations from three experts in the field, with time
17 for questions after each presentation.

18 Then the Panel will have an in-depth discussion
19 on these topics with our guest speakers and the audience.
20 So again, we look forward to everyone's input on these
21 discussions.

22 So first, I want to introduce Dr. Chris Simpson,
23 who spoke with us a number of months ago. Dr. Simpson is
24 a professor in the Department of Environmental and
25 Occupational Health Sciences in the School of Public

1 Health at the University of Washington, where he directs
2 the Exposure Sciences Program. His research involves
3 applying state of the art analytical chemistry techniques
4 to understand and control human exposures to hazardous
5 chemicals. He has a particular interest in biological
6 monitoring of chemical exposures in both occupational and
7 non-occupational settings. And for the past 10 years his
8 group has been pursuing research towards development of a
9 potential biomarker of exposure to disease exhaust.

10 Dr. Simpson will present new biomonitoring
11 results for 1-nitropyrene metabolites in children and
12 underground miners. So with that introduction, we look
13 forward to your presentation. Thank you.

14 (Thereupon an overhead presentation was
15 presented as follows.)

16 DR. SIMPSON: Thank you very much for that
17 introduction and the invitation and opportunity to talk to
18 you about nitropyrene again today. About a year or so
19 ago, I introduce this as a potential marker for diesel
20 exhaust.

21 --o0o--

22 DR. SIMPSON: And so I'll begin with just a quick
23 recap. So 1-nitropyrene is formed by nitration of
24 polycyclic aromatic hydrocarbons within diesel engines.
25 It's a relatively specific particle-associated marker for

1 diesel exhaust. That said, it's not -- it's important to
2 note that it's not absolutely unique to diesel exhaust.
3 So in the IARC monograph, you'll find several examples
4 where 1-nitropyrene is generated by non-diesel sources.

5 More recently, some studies out of China have
6 reported that 1-nitropyrene emissions are derived also
7 from residential combustion of low grade coal. That said,
8 it is the case that generally 1-nitropyrene emissions that
9 people are exposed to, especially here in the U.S., are
10 derived predominantly from diesel exhaust.

11 It's also worth noting that unlike the other
12 nitropyrene isomers, 1-nitropyrene is not formed to a
13 significant extent by photochemical reactions. Again,
14 there's been some recent data that showed that it is
15 possible to form 1-nitropyrene photochemically under some
16 discussions. But again, this is expected to be a very
17 small contribution to the total 1-nitropyrene ambient
18 concentrations.

19 --o0o--

20 DR. SIMPSON: I want to acknowledge that emission
21 controls on modern diesel engines have come along way, and
22 have dramatically reduced 1-nitropyrene emissions from the
23 engines themselves. That said, 1-nitropyrene is still
24 emitted by the contemporary diesel fleet. And as an
25 example of that, the attached graphic here is based on

1 measurements that we made in Seattle in 2012. That map
2 that you're seeing is the industrial area of the Duwamish
3 in south Seattle.

4 We collected two-week integrated air particulate
5 samples at 20 locations within the study area, and then
6 developed a land-use regression model that modeled the
7 spatial distribution of the 1-nitropyrene. And that's the
8 colored heat map that you can see.

9 Diesel source specific variables, including
10 proximity to railroads, the density of truck traffic, and
11 on-road measurements of mobile black carbon were all
12 significant components in this land-use regression model.
13 And so this indicates that variables associated with
14 diesel truck traffic and diesel railroad traffic are --
15 they're important predictors of the spatial variation of
16 1-nitropyrene concentrations at least in 2012 in the
17 Seattle area.

18 --o0o--

19 DR. SIMPSON: So this slide shows the metabolic
20 pathways of 1-nitropyrene in mammals. In vivo studies in
21 rats suggested that hydroxylated and the n-acetylated
22 metabolites, the two compounds highlighted in yellow at
23 the second level of the slide, are the most abundant
24 compounds in mammalian urine. And certainly, they're the
25 compounds that we have found to be the most abundant in

1 the human urine samples that we've measured in my lab.

2 I'll also note that the assay that we used is not
3 able to detect 1-aminopyrene, which is one of the other
4 metabolites shown on the slide here. There are data from
5 some other researchers, from both human and animal
6 studies, that indicate that 1-aminopyrene is formed
7 following exposures to 1-nitropyrene. And so this too may
8 be a potentially useful biomarker of exposure to diesel
9 exhaust.

10 --o0o--

11 DR. SIMPSON: So this chart summarizes
12 measurements of 1-nitropyrene and levels of the specific
13 urinary metabolite 8-hydroxy 1-nitropyrene from various
14 studies that have been undertaken in our laboratory at the
15 University of Washington. And what the plot is showing is
16 that higher metabolite levels on the Y axis are associated
17 with higher levels of measured exposure to 1-nitropyrene
18 shown along the X axis.

19 However, in the two occupational studies, that we
20 undertook, we found that at the level of the individual,
21 the urinary biomarker levels were not significantly
22 associated with the measured personal exposure on the day
23 of urine collection. So we see there's a dose response at
24 the group level, but not at the individual level.

25 And that prompted us to think about the temporal

1 relationship between exposure and biomarker level. So we
2 undertook a study in a cohort of underground miners in
3 which we were able to collect serial urine samples from
4 the -- from diesel exposed workers, and that will allow us
5 to explore more fully the time course of 1-nitropyrene
6 metabolite excretion following the inhalation exposure to
7 1-nitropyrene. So that study I will describe in the next
8 several slides.

9 --o0o--

10 DR. SIMPSON: So the study took place in a large
11 underground metal mine in the U.S. It had a worker
12 population of about 1,300 workers where they use extensive
13 use of diesel engines, and being underground there's a
14 limited amount of ventilation that's possible, and so the
15 workers are potentially exposed to relatively high levels
16 of diesel exhaust.

17 We enrolled 20 subjects in the study, and we
18 ensured the subjects had job titles that had them either
19 at the surface operations -- actually, at the face of the
20 mine where the active mining was taking place or in
21 underground maintenance shops. And previous work with
22 miners and diesel -- looking at diesel exposure has
23 indicated that exposure is highly correlated with the kind
24 of task that the workers are doing, and especially their
25 location within the mine. And so ensuring that we had

1 subjects at the surface, at the mine face, and then these
2 underground shops helped to ensure that we had a range of
3 exposures amongst the workers.

4 We undertook four sampling campaigns, each
5 campaign lasted for four days. This particular mine all
6 of the workers worked four days on and four days off. And
7 those are long work shifts, at least 10 hours in the mine
8 with another couple of hours getting down into the mine
9 and then getting back up to the surface.

10 --o0o--

11 DR. SIMPSON: So on those workers, we measured
12 personal exposure by measuring 1-nitropyrene and elemental
13 carbon using small personal sampling pumps and filters.
14 We did not have sufficient equipment to monitor full shift
15 exposures on all workers on every day. And so on each of
16 these sampling campaigns, we collected the personal
17 exposure samples for subjects 1 to 10 on days 1 and 3 of
18 their work week. And for subjects 11 to 20, it was on
19 days two and four of the work week.

20 For the urine samples, we were able to collect
21 pre-shift and post-shift samples for all workers every
22 day. So we have the full range of urine measurements,
23 even on days where we had not collected personal exposure
24 measurements. We also had subjects complete a daily
25 questionnaire regarding where they were working in the

1 mine and the specific tasks that they were doing, so that
2 we could use that questionnaire to predict exposures on
3 days that we had not measured the personal exposure.

4 --o0o--

5 DR. SIMPSON: So this current slide indicates the
6 variability in exposures amongst the workers. So just to
7 orientate you to it, the numbers 1 to 20 along the bottom
8 of the slide represent the 20 different workers. The
9 nitropyrene concentration is shown on the Y axis, and
10 that's a log scale or a log base 2 scale. And the -- each
11 of those bars represents the distribution of the
12 measurements for each worker. We've also colored those
13 bars representing either the surface, the underground work
14 shops or the face locations. And you can see that, in
15 general, the face locations in blue have higher levels of
16 exposure than the surface locations, and orange have lower
17 levels of exposure. That's also summarized in the table
18 at the bottom of the slide.

19 The geologists, we separated those out as a
20 separate category. Some days they were working at the
21 surface and some days, they were working down at --
22 marking at the face to indicate where mining activities
23 would take place. And so there, they suffered a much
24 wider range of exposures because they were working in
25 different parts of the mine.

1 --o0o--

2 DR. SIMPSON: This slide is a similar layout, but
3 now we're looking at the metabolite levels, and
4 specifically the 8-hydroxy nitropyrene metabolite level.
5 And again box plots showing the distribution of data for
6 each of the 20 workers. And in this case, we do not see
7 the same obvious stratification of exposure based on job
8 location that we had seen in the personal air
9 measurements. And the reason for that, I think, can be
10 explained in the following slide.

11 --o0o--

12 DR. SIMPSON: And so in this case, we're looking
13 specifically at the urine measurements. We're not
14 considering exposure at all. And we're looking at
15 variation in those urine biomarker concentrations across
16 the course of the workweek. So remember again, these
17 folks work four days on and four days off. The pre-shift
18 urine sample on day one, one would expect would be the --
19 would have the lowest concentration of biomarker level.
20 And indeed, that's what we see, both for the 6-hydroxy
21 compound and for the 8-hydroxy compound.

22 But then we see that as we progress across the
23 week measuring those post-shift urine samples, the
24 concentration -- or the biomarker concentration continues
25 to step up across the week. And it really has not

1 stabilized by the end of the week. And so that's
2 indicating that the metabolite levels are building up in
3 the workers. They're continuing to accumulate in the
4 workers as the exposure -- as they're exposed day after
5 day across the week.

6 I should note that we also looked at the
7 day-by-day exposures, and there was not a trend of an
8 increasing air exposure across the week. In fact, if
9 anything, the exposures tailed off towards the end of the
10 week as perhaps the mining operations were slowing down a
11 little bit at the end of each week.

12 So in the context of -- well, one way of
13 interpreting this data, so in a setting where workers or
14 community members are being exposed repeatedly, so day by
15 day, to nitropyrene, the biomarker level is going to
16 average out exposures over the preceding several days, and
17 so it's going to average out, to some extent, the
18 day-to-day variation and ambient exposures when you have a
19 setting of repeat exposures as you would in a community
20 setting.

21 --o0o--

22 DR. SIMPSON: Oh, I should qualify, that that
23 specific set of data I'm showing with these metabolite
24 levels that was for the first group. And so that was the
25 group of workers that, in general, had the highest

1 exposures to 1-nitropyrene. We saw a similar trend for
2 the shop group, although not quite as clear, because their
3 exposures were somewhat lower, and we really didn't see
4 any across-week trend in the exposures for the surface
5 group. Their exposures were essentially the same as what
6 one would expect for people that are simply exposed to
7 ambient concentrations.

8 --o0o--

9 DR. SIMPSON: The final slide that I'll show on
10 this diesel miner study is that the plots on the right
11 represent a prediction model where predicting -- where
12 we're regressing the measured urinary metabolite
13 concentrations measured versus predicted, where our
14 prediction model includes in the work location, the day of
15 the week and additional exposure-related variables, such
16 as the self-reported time that the workers said they were
17 exposed to diesel exhaust, and whether or not they were
18 using a respirator when they were -- when they felt they
19 were exposed to diesel exhaust or not.

20 And so what the takeaway from this specific slide
21 is that worker-specific measures of diesel exposure are
22 highly correlated with the biomarker levels. The more
23 activities the workers were doing that resulted in diesel
24 exposure, the higher level of biomarker that was observed
25 in the urine.

1 levels that we measured in this pilot study shown on the
2 left for the raw urine concentration and for the right as
3 creatinine corrected urinary concentration, we see that
4 for both of the metabolites, urine urinary levels were
5 two- to three-fold higher. And the samples from Oakland,
6 the presumptively high exposed group, compared to the
7 children from Salinas, which was the presumptively the low
8 exposed group.

9 These differences, while not -- are not
10 statistically significant, but remember this is a pilot
11 study with only 10 samples from the high exposed and the
12 low exposed group. And certainly, the trend here is
13 exactly what we would expect based on the presumptive
14 exposure.

15 --o0o--

16 DR. SIMPSON: Similarly, we were able to try and
17 drill down a little bit into the individual exposure
18 prediction. And so we examined the correlation between
19 the urinary biomarker levels and the subject's traffic
20 exposure, as measured by or as predicted by the traffic
21 density within various circular buffers surrounding the
22 homes where the subjects lived.

23 So that's a 500 meter, 1,000 meter, or 2,000
24 meter buffer. And what we see, shown in the table at the
25 bottom there, is that the -- in general, the exposure was

1 positively correlated with the traffic density,
2 particularly in those 1,000 meter and 2,000 meter buffers
3 for the two specific urinary metabolites. Again, the
4 correlations were not statistically significant, but they
5 were moderate and they were in the direction that we would
6 have predicted based on the higher exposures being
7 associated with higher levels of urinary biomarker.

8 --o0o--

9 DR. SIMPSON: Okay. So just a couple of summary
10 or concluding comments. So we now have shown in
11 approximately six or so different studies that these
12 1-nitropyrene metabolites can be reliably detected in
13 human urine, including from individuals with ambient
14 concentrations -- exposed to ambient levels of diesel
15 exhaust. So we can see these in highly exposed subjects,
16 but we can also see them in subjects with community
17 exposures to diesel exhaust.

18 All of these data strongly suggest that those
19 urinary metabolite levels increase as exposure to diesel
20 exhaust increases, both with the personal exposure
21 measures and also with the predicted exposures using
22 regression models.

23 We should note, by way of qualification, that we
24 don't yet know the extent to which exposures, other than
25 diesel exhaust, contribute to urinary 1-nitropyrene

1 metabolite levels. That's perhaps an area of -- that
2 needs to be considered further. But certainly the data
3 that we've shown so far indicates that the urinary levels
4 are associated with the inhalation exposures.

5 From a quantitative sense, we don't have a very
6 clear idea of how strong the relationship is between
7 inhaled nitropyrene and urinary metabolite levels. And in
8 large part, that is because we have not yet fully
9 completed the pharmacokinetic evaluation to determine what
10 is the appropriate window of exposure to associate with a
11 specific spot urine sample.

12 In summary, I believe that these metabolites
13 continue to show promise as biomarkers of exposure to
14 diesel exhaust. I have identified some important
15 knowledge gaps that we still need to answer before we can
16 complete the quantitative evaluation or association
17 between the inhalation exposure to these compounds,
18 specifically related to diesel exhaust, and the biomarker
19 levels. But in the various studies, I have shown, they
20 all point to -- you know, to a robust association between
21 diesel exhaust exposure and the biomarker levels.

22 Thank you.

23 CHAIRPERSON BRADMAN: Thank you, Dr. Simpson, for
24 that presentation. It's really fascinating. I think it
25 points to a lot of opportunities for discussion and follow

1 up.

2 So we have a -- right now, we have about 10
3 minutes for Panel questions. We're running a little bit
4 early so far, so that's good.

5 So, Dr. Luderer.

6 PANEL MEMBER LUDERER: Thank you. It was a
7 really interesting presentation. One of the things I
8 wanted to ask you about was the concentrations of the
9 nitropyrene metabolites in the miners versus the children.
10 Am I seeing that correctly, that they seem to be higher in
11 the children, the picograms per gram of creatinine -- or
12 milligram of creatinine?

13 DR. SIMPSON: So this -- let's see, this is a
14 linear scale for the children. Going back to the --
15 you're right, that is also linear. So that is an
16 interesting observation. We were surprised that the
17 biomarker levels in the miners were not higher. In fact,
18 the biomarker levels, in general, were kind of on the
19 lower end of what we've seen in other populations.

20 Of note, this population of miners is in a rural
21 part of Montana. And so their ambient exposures to
22 traffic related pollution and diesel exhaust are much
23 lower than what we would expect for an urban population.
24 And so that is the -- that is the best explanation I have
25 for the fact that these urine levels -- the absolute

1 levels amongst the miners were lower than what we saw in
2 the California samples.

3 PANEL MEMBER LUDERER: Just a follow up real
4 quick. Yeah, that's very interesting, because I think it
5 highlights the importance of ambient exposures that --
6 just in urban areas within the State of California. The
7 other question I had was how did the air -- the air levels
8 in the mine compare to say in the air levels that have
9 been measured in Oakland? You know, do you know, have
10 any --

11 DR. SIMPSON: So we did not measure nitropyrene
12 in the air in Oakland. I'm not -- so for the nitropyrene,
13 I'm not aware that there is existing data on that. Almost
14 certainly there's black carbon data for Oakland, and so we
15 could look at that and compare that to the elemental
16 carbon levels in the mine.

17 I should note that the elemental carbon levels in
18 the mine were, in fact, well below the occupational
19 standard. So the emission control technologies and the
20 ventilation that they're using in that particular mine are
21 very effective. One could surmise that the only reason
22 they let us into that mine was they knew we would not find
23 a violation.

24 (Laughter.)

25 CHAIRPERSON BRADMAN: I'm just curious where the

1 mine was located?

2 DR. SIMPSON: So it's in Montana. I'm not at
3 liberty to tell you where in Montana, because the mining
4 industry is somewhat sensitive to potential liability and
5 so on and presenting data on worker exposures. So I can
6 tell you that it's a large platinum mine, but I'm not at
7 liberty to say which specific mine it is.

8 CHAIRPERSON BRADMAN: Were there any -- you
9 mentioned that the black carbon levels were low. Were
10 there any other measures of ventilation, like carbon
11 monoxide or other -- CO2 or --

12 DR. SIMPSON: So we -- on the workers, we were
13 only measuring particle related measures. We did have
14 some area measurements of CO2, CO, and NO2. The CO was
15 well below -- well, the CO was well below the regulatory
16 standard. The NO2 occasionally was a problem. So the way
17 the mines have been able to get their particle emissions
18 under control is by using oxidation catalysts, and that
19 has increased the NO2 emissions. So in order to get in
20 compliance with the particle regulations, they now have a
21 concern in times of violating the NO2 regulation.

22 CHAIRPERSON BRADMAN: Dr. Quintana.

23 PANEL MEMBER QUINTANA: Hi. Thank you for that
24 presentation. Do you think an additional reason that the
25 children may have had quite high urinary metabolites might

1 be due to the fact that with their small body size and
2 increased breathing rate, that even with a lower exposure,
3 they could potentially have a very high internal dose or
4 perhaps even have metabolic differences that might lead to
5 observed differences?

6 DR. SIMPSON: That's a very good question. So
7 there -- there have been no -- in fact, this California
8 data is the first data that I'm aware of that has reported
9 nitropyrene metabolite levels in infants. And so there's
10 been no studies to look at the potential metabolic
11 differences between adults and children. But you're
12 absolutely right, one of the reasons why children are
13 considered an at-risk group is that their dose per mass of
14 body weight is higher than it is for an adult, because
15 they -- because of the higher relative ventilation rate
16 that they have.

17 CHAIRPERSON BRADMAN: Dr. McKone.

18 PANEL MEMBER MCKONE: I want to move to a
19 different question in terms of chemical properties. And
20 this is not very volatile, right?

21 DR. SIMPSON: Exactly, it's --

22 PANEL MEMBER MCKONE: So your understanding is
23 most of this is -- most of what would be going into an
24 individual is bound to the particle phase as opposed to
25 being a mix of particle and gas, like some -- some of the

1 nitro-PAHs have enough volatility that you have to keep
2 track of two phases --

3 DR. SIMPSON: Exactly.

4 PANEL MEMBER MCKONE: -- if you really don't want
5 to --

6 DR. SIMPSON: Yeah. So you're absolutely right.
7 The literature on 1-nitropyrene demonstrates that as
8 present, we say exclusively in the particle phase by which
9 we mean greater than 95 percent, even greater than 99
10 percent under typical environmental temperatures.

11 CHAIRPERSON BRADMAN: A follow-up question
12 related to Tom McKone's. Do we have a sense about how
13 much of the exposure could be non-dietary ingestion, if
14 it's in, you know, particles, so there may be some house
15 dust or larger particles, maybe not fully inhaled and
16 then -- so do we have a sense of how the 1-nitropyrene
17 may --

18 DR. SIMPSON: So we do not have a quantitative
19 sense of that. And the IARC monograph that lists prior
20 measurements of nitropyrene by environmental media, there
21 are certainly examples where nitropyrene has been measured
22 in foodstuffs. Those studies have not -- are certainly
23 not comprehensive in nature, and so they indicate that the
24 potential for exposure via that pathway exists, but no
25 studies to this point have looked to do a mass balance or

1 compare the relative importance of the inhalation pathway
2 versus the dietary pathway for nitropyrene.

3 PANEL MEMBER BARTELL: I just enjoyed your
4 presentation. Thank you. But I had a quick question
5 about the pharmacokinetics, which is the note you ended
6 on. And I think you've hinted that, and certainly slide
7 10 suggests that, you know, there might be a relatively
8 short half-life for some of the process involved in
9 producing these metabolites, since you see these kind of
10 rapid changes post-shift. I was just curious how you plan
11 on proceeding with pharmacokinetic modeling? Are there
12 animal data or any plans or is anybody working on sort of
13 an animal pharmacokinetic model, or are you going to try
14 to rely kind of solely on the observational data you have
15 here to try to suss out the pharmacokinetics?

16 DR. SIMPSON: So from the point of view from my
17 expertise, I'm not an animal toxicologist, and so I'll be
18 relying on trying to fit models to our human data to
19 extract the pharmacokinetic parameters that way.

20 There does exist in the literature a PBPK model
21 for inhalation exposure to 1-nitropyrene that was
22 developed I believe on rats. And so we can look at trying
23 to use that -- try that -- apply that model with the human
24 data to see if that model fits the data reasonably.

25 The only other studies that I'm familiar with

1 with rats and so on have been -- have essentially been
2 single dose studies. And in the case of diesel exhaust,
3 clearly we're typically interested in chronic exposure.
4 And there's some challenges in translating results from a
5 single exposure study to a chronic exposure situation.

6 PANEL MEMBER BARTELL: Thank you.

7 CHAIRPERSON BRADMAN: Dr. Quintana.

8 PANEL MEMBER QUINTANA: So have you thought of
9 collaborating with some of the human controlled exposure
10 to diesel exhaust studies, either yourself or I know
11 there's archived samples from some of those known
12 exposures, which tend to be a little high in level, but it
13 might be interesting for pharmacokinetics.

14 DR. SIMPSON: Exactly. So we've started to do
15 some of that work with colleagues at the University of
16 Washington where they have a human exposure facility. We
17 don't yet have the data from those particular studies.

18 One of my -- one thing that gives me pause, in
19 terms of maybe lowers my expectations for that particular
20 study is that as one might imagine, we really can't expose
21 humans to very high levels for long periods in those
22 controlled studies. And so you'd have the exposure
23 protocol as a two-hour exposure to, I think, it's a 100
24 micrograms per cubic meter of elemental carbon, which is
25 relatively high in terms of ambient exposure levels. But

1 once you compare that exposure to weaker ambient levels,
2 then the controlled part of the exposure is actually not
3 such a substantial piece of the integrated exposure over
4 four or five days when you can't include in the ambient
5 piece of it. So that's -- that may not be as much of a
6 slam dunk as we might hope it would be.

7 CHAIRPERSON BRADMAN: Are there --

8 PANEL MEMBER LUDERER: I do have one more
9 question.

10 CHAIRPERSON BRADMAN: Dr. Luderer.

11 PANEL MEMBER LUDERER: I just had a quick follow
12 up to that. In that study, was there any kind of effort
13 done sort of to have a wash-out before the exposure, you
14 know, have participants spend time in a, you know, place
15 where the air is known to be clean, you know, filtered?

16 DR. SIMPSON: No. So that particular study was
17 really focusing on acute -- attempts to identify acute
18 health outcomes associated with acute exposures. And so
19 there was a cross-over design where they exposed people
20 for two hours to diesel exhaust, and then a week or so
21 later, they exposed people for two hours to filtered air,
22 but they did not attempt to have a sustained period of low
23 or zero exposure to diesel exhaust before the controlled
24 exposure part of it.

25 CHAIRPERSON BRADMAN: I also have another -- I

1 have another follow-up question to the pharmacokinetics,
2 the comments earlier. Do we have any sense of how the
3 pharmacokinetics may differ say between children and
4 adults. So if we look at the metabolites in children
5 versus the adults, it's a possibility that the relative
6 proportion of different pathways may result in a different
7 balance of metabolites by age? And then related to that,
8 is it also possible that there may be genetic or other
9 factors that may change the balance of how the one
10 1-nitropyrene is metabolized, which might result in
11 different relative proportions of the metabolites based
12 on, well, either age or kind of within subject
13 variability?

14 DR. SIMPSON: Sure. So the -- in terms of there
15 being different proportions of metabolites for infants
16 versus adults, I really don't have the expertise, in terms
17 of developmental toxicology science to have a good sense
18 of whether we would really expect there to be a different
19 balance of metabolites.

20 We do have an idea of which enzymes are involved.
21 And so there's clearly a group of P450s involved in the
22 hydroxylation step. And, in fact, there's been some
23 studies with human microsomes that kind of focus down on
24 to which specific isoforms seem to be most important.

25 And clearly, those are polymorphic in humans, and

1 so there's the opportunity for there to be differences
2 between people based on their -- the specific gene forms
3 that they have.

4 Similarly, the acetylated metabolites, those are
5 formed via the acetyltransferase enzymes. And those
6 certainly are polymorphic in humans. We have fast
7 acetylators and slow acetylators. And so we would expect
8 that -- or we would hypothesize that that could lead to a
9 different balance, and possibly a different time course,
10 in terms of the excretion of these metabolites based on
11 the specific genetic make-up that you have.

12 With some of the samples that we collected over
13 from prior studies, where we were interested in exposure,
14 we did go back and have done some genotyping for --
15 certainly for the N-acetyltransferases, so that we can try
16 and look at that particular question. We don't have the
17 data from those studies available yet though.

18 CHAIRPERSON BRADMAN: Are there any more
19 questions from Panel members, discussion?

20 Okay. Well, I think at this point then we'll
21 conclude this presentation. Thank you so much
22 for contributing --

23 DR. SIMPSON: Thank you very much.

24 CHAIRPERSON BRADMAN: -- and look forward to
25 additional discussion on this.

1 At this point then, I want to introduce Dr.
2 Vanessa Galaviz. Thank you.

3 Dr. Galaviz has 10 years of experience in
4 multiple aspects of environmental health, including
5 industrial hygiene exposure -- industrial hygiene exposure
6 assessment, genetic and molecular susceptibility to
7 environmental pollutants, evaluating cumulative impacts,
8 community-based participatory research, environmental
9 justice, and air pollution.

10 She currently works with the CalEPA Assistant
11 Secretary for Environmental Justice and Tribal Affairs,
12 and Deputy Secretary for Science and Health on various
13 public health issues of concern for environmental justice
14 communities.

15 Dr. Galaviz, who also holds a position as an
16 associate toxicologist at OEHHA, is continuing her work on
17 several CalEnviroScreen projects, including acting as
18 contract manager for a project with the University of
19 Washington to evaluate air quality in San Diego County.
20 Dr. Galaviz will present her research on urinary
21 metabolites of 1-nitropyrene in the U.S. -- in U.S./Mexico
22 border residents. So welcome to today's meeting, and we
23 look forward to your presentation.

24 Thank you.

25 (Thereupon an overhead presentation was

1 presented as follows.)

2 DR. GALAVIZ: Thank you for having me here. And
3 I am excited to talk to you about this study, looking
4 at -- it's a community-based study that looked at diesel
5 exposure using 1-nitropyrene and its urinary metabolites
6 in persons at the U.S./Mexico border.

7 --o0o--

8 DR. GALAVIZ: So the U.S./Mexico border is
9 defined by the U.S. EPA as 62 miles north and south of the
10 U.S./Mexico inland boundary, and extends into the sea
11 boundaries to the east and west, as outlined by the red
12 line in the image to the right.

13 --o0o--

14 DR. GALAVIZ: So zooming in to the California and
15 Baja, California international border, you'll notice
16 there's currently six border -- six ports of entry. And
17 to the furthest west is the San Ysidro port of entry.

18 --o0o--

19 DR. GALAVIZ: Now, zooming into that port of
20 entry, you'll notice that San Ysidro is bounded by the San
21 Ysidro to the north, which San Ysidro is a district of the
22 City of San Diego, and Tijuana to the south. And Tijuana
23 is the largest city in Baja, California.

24 Now, this border crossing happens to be the
25 busiest border crossing in the Western Hemisphere. And

1 this data that was collected was in 2010. And here, you
2 can see the number of vehicle crossings in 2010, over 13
3 million crossings, and pedestrians, over six million
4 pedestrian crossings in 2010, as well as over 70,000 buses
5 that crossed northbound from Tijuana into California.

6 --o0o--

7 DR. GALAVIZ: So if you zoom in further, of
8 concern is the pedestrian pathway. And as you notice, to
9 the image on the right, the pedestrian pathway is to the
10 east of the 24 northbound lanes, and the six southbound
11 lanes at this border. And their pathway is right within
12 feet of the one bus pathway. And so these -- the commute
13 time for the vehicles can average around two hours. And
14 depending on the time of year, I mean it could go up to
15 four hours. And so with the pedestrian pathway, their
16 commute time also averages about an hour. And so these
17 are idling vehicles next to these -- this pedestrian
18 pathway.

19 --o0o--

20 DR. GALAVIZ: And one thing I forgot to note on
21 the image to the left, you'll see a red line going from
22 Mexico into the U.S. And that is the pedestrian pathway.
23 And that pathway, as you can see, can extend pretty far
24 south as commute time gets longer. So what previous work
25 has shown prior to this study was that occupational

1 studies have shown differences in diesel exposure between
2 high exposure groups and low exposure groups, using either
3 1-nitropyrene or its metabolites.

4 There was also human studies showing that urinary
5 metabolites of 1-nitropyrene were higher in participants
6 with higher exposure to diesel. So one of the data gaps
7 was can we detect a difference at the community level
8 between a high exposed group and a low exposed group using
9 both 1-nitropyrene and its urinary metabolites.

10 --o0o--

11 DR. GALAVIZ: So the purpose of the study was to
12 compare the personal samples of 1-nitropyrene to the
13 urinary metabolites in the ability -- or in a high exposed
14 group and a low exposed group at the community level. So
15 what we did is we compared the urinary concentrations
16 between border commuters and non-border commuters. And we
17 also looked at the association between personal 1-NP and
18 urinary metabolites using a multi-level linear regression
19 model.

20 --o0o--

21 DR. GALAVIZ: So for participant selection, we
22 obviously had inclusion -- or exclusion criteria to
23 account for any potential confounders. And so all
24 participants had to be 18 years of age or older, they had
25 to be non-smokers living in a non-smoking household, they

1 had to be free of any chronic conditions, they were not
2 occupationally exposed to diesel exhaust, and they had to
3 consent to IRB.

4 Now for border commuters, they had to cross the
5 border at least two times a week or more as a pedestrian.
6 And for non-border commuters, they were not able to
7 cross -- they did not cross the border, any port of entry,
8 in the prior four months.

9 --o0o--

10 DR. GALAVIZ: So the samples that were collected,
11 we collected 24-hour samples. There was two ways study
12 members could participate, one was having a 24-hour time
13 activity diary with a questionnaire and a spot urine
14 sample following their commute northbound across the
15 pedestrian pathway. The second way they participate was
16 the same questionnaire, 24-hour time activity diary, a
17 spot urine sample, but wearing a backpack with a pump that
18 was connected to a PM2.5 filter that was able -- we were
19 able to analyze for 1-nitropyrene.

20 And as you can see in this picture, it kind of
21 gives you an idea of the backpack with the tube coming out
22 and the impacter located near their breathing zone.

23 --o0o--

24 DR. GALAVIZ: So this obviously presented a lot
25 of challenges. I mean, it took us a -- about a year to

1 get approval to do the study from GSA and the Customs.
2 And so it's an international border. It's high security.
3 Imagine having -- being a participant wearing a backpack
4 with loud pumps and tubes coming out.

5 (Laughter.)

6 DR. GALAVIZ: I mean, it's kind of nerve-racking.
7 So in order to alleviate some of those concerns, I myself
8 participated and did some pilot studies walking with the
9 backpack, a loud noise, with tubes coming out across the
10 border a few times. Nothing happened to me. Everything
11 was safe. So it kind of alleviated our concerns that, you
12 know, we were not going to, you know, potentially put
13 these participants in any danger.

14 And so as you know, there are people that are
15 concerned, you know, with any bomb threats that could
16 happen, waiting at an international border. Not only
17 that, but occupational safety with anything happening to
18 the workers that worked there. So what we did is we gave
19 them training about what the equipment was, if they
20 were -- if they knew when a study participant was going to
21 cross the border. They had fliers of the type of
22 equipment. And if there was any concerns, I was there and
23 at the border during the whole time any border commuter
24 had to cross the border just in case.

25 And so an additional challenge was timing of

1 getting the urine samples. So these are people that
2 are -- that cross the border mainly for work and/or
3 school. And so their time was very limited. They were
4 waiting in line for hours to get across the border. They
5 have to go where they need to go. And so sometimes I was
6 able to collect the sample immediately when they crossed,
7 sometimes I had to collect the sample eight hours later
8 after they crossed. So it kind of -- that became a little
9 challenge, but, you know, we did what we could do with the
10 study population due to their constraints.

11 --o0o--

12 DR. GALAVIZ: So as a result, there was repeat
13 participations. And the criteria for them to repeat is
14 that three weeks had to pass from their last
15 participation. So as a result of repeat participants, we
16 had a total of 73 border commuters sampling events, and 18
17 non-border commuter sampling events.

18 And in total, there was 27 border commuters, and
19 17 non-border commuters. And all border commuters lived
20 in Tijuana, and all non-border commuters lived in south
21 San Diego. And they all self-classified as Hispanic.

22 The reported mean northbound vehicle delay time
23 was 83 minutes, and it ranged from 32 to 137 minutes. And
24 this kind of was an indicator of the amount of idling
25 traffic commuter on the pedestrian pathway. And the

1 border commuters on average spent 60 minutes waiting in
2 line to cross the border northbound, with a range of 20 to
3 200 minutes.

4 --o0o--

5 DR. GALAVIZ: So in this slide, I just want to
6 talk that with urine, we were able to analyze creatinine
7 in a subset of the participants, because we had enough
8 urine sample. It was not known if this was needed for
9 these metabolites, but we did this as an exploratory
10 analysis. And it was measured by the University of
11 Washington's Hospital Clinical Laboratory using a
12 colorimetric assay.

13 --o0o--

14 DR. GALAVIZ: So in this study population, there
15 was two metabolites that we were able to detect with
16 reliability. It was the 8-OHNP and the 8-OHNAAP.

17 --o0o--

18 DR. GALAVIZ: And here, shows you the comparison
19 between the non-border commuters and the border commuters.
20 So with both metabolites, we had a higher concentration in
21 the border commuters than the non-border commuters. And
22 with the sum of the metabolites, you'll see for both the
23 unadjusted and the creatinine-adjusted, we had
24 significantly higher levels, which shows you that having
25 the sum of metabolites seemed to be a more robust measure.

1 --o0o--

2 DR. GALAVIZ: With here, looking at the
3 association between the personal 1-NP and the urinary
4 metabolites, we saw that there was an increase of 1-NP for
5 each increase of urinary metabolites. So we did -- this
6 was done for all participants. So we combined the border
7 commuters and the non-border commuters. And it was
8 specific -- each urine sample was specific to that
9 personal 1-NP sample. And we also -- this was done for
10 the unadjusted -- the unadjusted urinary metabolites. But
11 we found that the effect estimates were similar for the
12 creatinine adjusted as well. And that this was also done
13 with both samples being above and below the limit of
14 quantification. And we found that the effect estimates
15 were modestly attenuated when we excluded data below the
16 limit of quantification.

17 --o0o--

18 DR. GALAVIZ: So in conclusion from this, we were
19 able to see -- we were able to see a difference in urinary
20 metabolites between a high exposed group and a low exposed
21 group at the community level, which hasn't been done
22 before. We were able to also see that border commuters
23 had higher concentrations than non-border commuters
24 showing that they had higher exposure to diesel exhaust,
25 whether from the border or from the background

1 concentrations of where they lived is another question
2 that couldn't be answered here.

3 We had higher urine 1-NP metabolites associated
4 with higher personal 1-NP exposures. But as Dr. Simpson
5 had previously mentioned, you know, this only explains a
6 small proportion of the variability between personal
7 exposure and urinary metabolites.

8 And that concludes. Do you guys have any
9 questions?

10 CHAIRPERSON BRADMAN: Thank you very much for the
11 presentation Dr. Galaviz.

12 So we also again have 10 minutes budgeted right
13 now for questions from the Panel about the presentation.

14 Dr. Luderer.

15 PANEL MEMBER LUDERER: Thank you for that
16 presentation. That was really very interesting. My
17 question has to do with the roadway traffic exposures for
18 the non-exposed. What's the traffic density like around
19 where they were living? I was --

20 DR. GALAVIZ: Well, so with the eligibility
21 criteria for living in south San Diego to be the control
22 group, you had to have similar population density as
23 Tijuana, so only certain zip codes were allowed to
24 participate. And one of them -- so San Ysidro is bounded
25 by three major freeways. And so the traffic density is

1 quite high in those populations as well as the control
2 population.

3 CHAIRPERSON BRADMAN: Dr. McKone.

4 PANEL MEMBER MCKONE: I just -- you know, you're
5 making progress. You have a model, right? I mean, the
6 problem with this is we're still working in a qualitative
7 way. I mean, in the previous study that we heard about
8 from the miners and children and in this one, I mean,
9 we're seeing the association. And your model seems like
10 it could predict the association, but how far are we from
11 actually predicting exposure going backwards from the
12 biomarkers and having some reliable ability to say it's in
13 this range or do you think we're ready to go there yet?

14 I mean this is kind of more an open question that
15 we may save it till the end, but I think it's one that,
16 you know, we always look at, like we're getting there.
17 We're really getting close, but how close are we?

18 DR. GALAVIZ: Well, I mean, to have a strong
19 understanding of being able to detect a biomarker, both at
20 high exposure community settings, such as occupational,
21 and low exposure community settings in the, you know,
22 ambient concentrations, I mean, that's -- it's really
23 important to have confidence in being able to detect these
24 wide range of exposures. So all these studies together
25 bring that confidence. But you're right, there is a lot

1 more to add to that model to help understand
2 predictability. And that, of course, is going to come
3 with a bigger study with tons more money to understand all
4 these independent predictive variables that are necessary
5 for this.

6 How far we -- how far away are we from that? I
7 don't know. I think Dr. Simpson probably would be the
8 best to answer that.

9 PANEL MEMBER MCKONE: Well, that leads to a
10 follow-up question is, so it's interesting, because, I
11 mean, it looks like we could get there. I mean, we're not
12 there yet, but I think that's an important point. It's
13 with enough -- I mean, it's like any study, if you do it
14 with 15 people, you'll see a trend, right, but you can't
15 really say much. If you have 100,000 people, you can do a
16 lot, right? You can -- making the analogy to
17 epidemiology, but in exposure science, you know, once you
18 have a large enough pool to do your calibration and really
19 get the variability down, so you really think, I mean --
20 and I open this up again to others. I mean, are we
21 getting to that point where if we got more people, more
22 samples, more situations, we probably could get the
23 variability down to where we feel like we can make
24 predictions backwards from biomarkers.

25 DR. GALAVIZ: I think so. I mean, this pilot

1 study and others kind of give an understanding that there
2 is going -- there is differences between different
3 subpopulations, such as children and older adults. And
4 also, not only that, but there's going to be within
5 individual variability as well that we need to account
6 for, such as genetics. So I think we're starting to get a
7 better understanding of what type of predictive variable
8 to account for, and then in a next bigger study.

9 CHAIRPERSON BRADMAN: Dr. Bartell.

10 PANEL MEMBER BARTELL: So I had just a quick
11 comment in response to Tom's question to throw in here in
12 the mix with inter-individual or intra-individual
13 variability. The temporal variation in exposure, and its
14 relation to the biomarker, I think is a really critical
15 point that we should bear in mind.

16 And I think it's going to be very difficult to
17 sort of use these biomarkers to reliably make connections
18 with ambient exposures, until we actually understand
19 enough about the pharmacokinetics to say what that
20 temporal variability is in terms of the contribution.
21 Because otherwise when we go out and measure a group of
22 people, as we saw on the first study, you know, as we
23 average over groups, we'll get very reliable indicators of
24 group exposure. But if there's a short half-life, you're
25 going to see wide variability over the same individuals

1 over time.

2 And I think that story has actually emerged. Dr.
3 Bradman's written some papers on this with urinary
4 pesticides, and biomarkers for those, which, you know,
5 were actually used for decades and thought to be pretty
6 reliable biomarkers, but it turns out they have very low
7 intra-individual correlation over even relatively short
8 periods of time. And we're even seeing that with some
9 longer term biomarkers like mercury and blood during
10 pregnancy, which actually also is poorly correlated across
11 different trimesters of pregnancy.

12 And I've written on this and others have written
13 on this as well, but I think part of the story that we
14 really need to understand, in terms of interpreting that
15 exposure versus biomarker relationship is how the
16 pharmacokinetics affect the temporal variability in
17 biomarkers.

18 CHAIRPERSON BRADMAN: Dr. Quintana, you had a
19 question.

20 PANEL MEMBER QUINTANA: This one to follow up on
21 that comment on variability. And so one obvious comment I
22 guess is because the half-life of these metabolites were
23 not known at the beginning of these studies, they weren't
24 designed to have the best chance of finding a correlation
25 between external exposures and metabolite. For example,

1 in the study, the exposure was a previous 24 hours, and
2 based on the data that Dr. Simpson presented, perhaps a
3 week's exposure would have been a better chance. And so
4 some of the disconnect is the study design, I think, which
5 might make it look less associated than if it was
6 correctly matched, as we understand this more and more.

7 But I have to say that I agree that variability
8 is an issue, but if we go back to the example of cotinine
9 has a very short half-life. It's a metabolite of nicotine
10 and it's used to indicate exposure to second- and
11 third-hand smoke. The half-life is 17 hours, which is
12 very short. And you might think, looking at
13 pharmacokinetics and everything, this will be a terrible
14 biomarker, because it's such a short half-life. But, in
15 fact, if the behavior is stable enough, and the exposure
16 is stable enough, even a short half-life marker can be
17 very, very accurate.

18 And so it comes down to what is the exposure? If
19 it's 24/7 at your house, perhaps the variability in the
20 half-life will be less of an issue than if it's once a
21 week you go see grandma and it's -- that's where you get
22 your exposure, I guess.

23 CHAIRPERSON BRADMAN: Yeah, I think these are all
24 very good points, and it's clear there's a lot of interest
25 here in these studies on this issue.

1 Any other questions?

2 Maybe later on this after -- this morning, we
3 can -- when we have more time for discussion, we can also
4 kind of get into some of the issues around study design,
5 you know, maybe we need to look at serial samples
6 collected daily, and really look at some of those
7 questions around inter- and intra-individual variability.

8 So I just wanted to clarify. It was just
9 mentioned, but the air samples were collected for 24
10 hours.

11 DR. GALAVIZ: That's correct.

12 CHAIRPERSON BRADMAN: Okay. Yeah, I think you're
13 right, Dr. Quintana, that -- because we had 24 hours of
14 air sampling relative to a biomarker that might reflect a
15 longer period of time, the actual, you know, 20 -- 15 to
16 20 percent increases in the model actually, you know,
17 probably make a lot of sense in that it would have been
18 greater if we had a longer time frame of air monitoring.
19 I think that's a really good point, and just that this
20 data also reinforces the value of this biomarker as an
21 exposure metric.

22 DR. GALAVIZ: I mean, one more thing to note is
23 that for the personal 1-NP sample concentrations there's a
24 five-fold higher difference in border commuters than
25 non-border commuters. So that's important to account for.

1 CHAIRPERSON BRADMAN: So are there any more
2 questions from the Panel?

3 Okay. Then I think we -- thank you very much for
4 your presentation. And we will have some more time to
5 discuss these issues in more detail as we go through our
6 next -- after our next presentation, looking at PAHs and
7 I'll be introducing Dr. Luderer from our Panel for her
8 work.

9 (Thereupon an overhead presentation was
10 presented as follows.)

11 CHAIRPERSON BRADMAN: Dr. Ulrike Luderer is a
12 Professor of Medicine in the Division of Occupational and
13 Environmental Medicine at the University of California at
14 Irvine. She is also the Director of the Environmental
15 Health Sciences graduate program. Dr. Luderer's research
16 focuses on mechanism of action of reproductive toxicants,
17 and on the roles of antioxidants and oxidative stress in
18 reproductive toxicity and reproductive aging.

19 She has served on several national and
20 international expert panels, such as the U.S. EPA Science
21 Advisory Board, Environmental Health Committee, and, of
22 course, our esteemed Panel here.

23 Dr. Luderer will present initial results from a
24 Biomonitoring California laboratory collaboration that
25 measured several PAH metabolites in women for a substudy

1 of Women's Health and the Environment.

2 So thank you. Enough of the formalities, and we
3 welcome your presentation today.

4 PANEL MEMBER LUDERER: Well, thank you very much.
5 I'm really excited to be able to share some the data from
6 this laboratory collaboration with the Environmental
7 Health Laboratory.

8 --o0o--

9 PANEL MEMBER LUDERER: So the Women's Health and
10 the Environment study, our long-term goals are to
11 translate some of the findings of what we know about
12 toxicant effects on the ovary from animal studies to
13 humans and to look at ovarian dysfunction in humans. And
14 so this was really a pilot study to demonstrate the
15 feasibility of a larger study that we hope to do, testing
16 the hypothesis, the genetic variations in
17 biotransformation enzymes that are involved in
18 metabolizing PAHs, modulate the ovarian toxicity of PAHs
19 in women.

20 And some of what we wanted to test the
21 feasibility of was -- one of the main things we wanted to
22 test the feasibility of was using a micro-electronic dip
23 stick monitor. So these are monitors that are sold
24 commercially that can be used by women who are trying to
25 become pregnant, and they enable you to get daily

1 measurements of two urinary reproductive hormones, LH,
2 luteinizing hormone, which is in the main stimulus for
3 ovulation, and the primary estrogen metabolite
4 estrone-3-glucuronide.

5 And we wanted to see whether we could feasibly
6 ask women to do that for multiple menstrual cycles, as
7 well as doing home urine collection of urine samples for
8 exposure biomarkers over multiple menstrual cycles as
9 well.

10 --o0o--

11 PANEL MEMBER LUDERER: So the toxicants that we
12 were focused on in this pilot study and in the laboratory
13 pilot collaboration are polycyclic aromatic hydrocarbons.
14 So this is a little bit different from the last two
15 presentations. We're not dealing with the diesel
16 specific -- or more relatively diesel specific PAHs, but
17 the other PAHs, the non-nitrated PAHs, the compounds that
18 are produced by the incomplete combustion of organic
19 materials, and some of the organic materials are shown
20 here.

21 Let's see, it looks like the pointer is not
22 working.

23 The food is food, meat, barbecuing, grilling, and
24 smoking, burning tobacco, of course, is a well known
25 source of exposure, burning wood, burning fossil fuels, as

1 well as exposure to hydrocarbon -- raw hydrocarbons as is
2 shown here by the oil spill clean-up picture.

3 --o0o--

4 PANEL MEMBER LUDERER: So just to show you the
5 structures of the parent compounds of the metabolites that
6 we measured, these are small relatively polycyclic
7 aromatic hydrocarbons, naphthalene, fluorene, phenanthrene
8 and pyrene. These metabolites -- the metabolites of these
9 compounds and some of the metabolism of the phenanthrene
10 is shown in the lower part of this slide showing you the
11 three 3-hydroxylated phenanthrene and then analogous
12 metabolism by cytochrome P450 also forms other
13 mono-hydroxylated metabolites. And in this study, we
14 measured three, the 1-, 2-, and 3-hydroxyphenanthrene.

15 So these hydroxylated metabolites of these small
16 PAHs are excreted in the urine. And we know NHANES has
17 been measuring these metabolites for quite some time, so
18 we know that these are detectable in nearly 100 percent of
19 Americans that were biomonitoring in the NHANES study.

20 We also know that the larger PAHs, such as, for
21 example, benzopyrene or dimethylbenzanthracene, which is
22 often used in experimental studies, these are metabolized
23 in analogous manners, but those metabolites are excreted
24 predominantly in the feces. And so for biomonitoring you
25 really don't find those in large proportions of the urine

1 samples. And so NHANES has been measuring these
2 metabolites of the smaller PAHs.

3 --o0o--

4 PANEL MEMBER LUDERER: So the ovarian toxicity of
5 PAHs. Why are we interested in looking at PAHs on ovarian
6 function?

7 So there's a wealth of literature from the
8 toxicology data. I just wanted to briefly talk about some
9 of that here to give you an idea of why are we interested
10 in this question. So we know from rodent studies that
11 polycyclic aromatic hydrocarbon exposure dose-dependently
12 destroys the primordial and primary follicles. So
13 primordial follicles are the ovarian reserve. There's a
14 finite number of those. And when they're depleted, you
15 have premature ovarian failure.

16 We also know that in utero exposure to
17 benzopyrene, a particular PAH, decreases fertility and
18 depletes germ cells in the female offspring. And we also
19 have data in women, not about PAH data -- PAH exposure
20 specifically, but about exposure to smoking, which as we
21 know, as I just mentioned, is a major source of PAH
22 exposure. That women who smoke also have earlier onset of
23 menopause, and decreased fecundity. And that daughters of
24 women who smoke, there are fewer studies looking at
25 daughters of women who smoked, but they -- if their mother

1 smoked during pregnancy, that has also been associated
2 with decreased fecundity, as well as earlier age of
3 menopause in the daughters.

4 So that sets the background for why we're
5 interested in this. But I'm going to be talking really
6 about the exposure part of it today. And I hope to, at
7 some point, be able to come back and talk about the
8 associations that we found with ovarian function.

9 --o0o--

10 PANEL MEMBER LUDERER: So overview of the study.
11 So this was -- the participants were women residing in
12 Orange County, California, who were 18 to 44 years old.
13 They -- because we were interested in looking at
14 reproductive hormones, they had to not be using hormonal
15 contraception, have no history of surgical sterilization,
16 infertility treatments with known ovotoxic -- treatment
17 with known ovotoxic agents.

18 And so this was really -- this was a convenience
19 sample. We had based -- at the base-line visit, a very
20 extensive questionnaire that was really modeled after the
21 National Children's Study questionnaire that was being
22 piloted at the time, was administered. We obtained blood
23 samples for ovarian reserve markers and biotransformation
24 polymorphisms.

25 And then the women were given the home urinary

1 hormone monitor and instructed in how to use that, as well
2 as the home urine collection kits. And then they were
3 asked to do daily urinary reproductive hormone monitoring
4 using these micro-electronic monitors, where essentially a
5 woman identifies on the first day of bleeding in the
6 menstrual cycle the window, which is a six-hour window
7 during which she can -- would then be doing the urinary
8 test for that cycle.

9 And the monitors are designed for commercial use,
10 so they request -- they have an algorithm which decreases
11 the number of days during which they actually request test
12 sticks as subsequent cycles ensue. But the maximum number
13 of days during the cycle that test sticks would be
14 requested by the monitor would be 20 days.

15 So most of the data for the hormones will be
16 coming from the follicular phase and the mid-cycle
17 pre-ovulatory stage. We also asked the women then on
18 cycle day 10, which is during the follicular phase, since
19 most of the urine data for the hormones will also be from
20 the follicular phase, we wanted the biomarker to also be
21 collected during the follicular phase. So we asked them
22 to collect urine on cycle day 10, and they aliquoted four
23 vials totaling 20 ml of urine. And then we asked them to
24 keep a daily diary that included questions on menstrual
25 bleeding, smoking, medication, and alcohol use as well.

1 --o0o--

2 PANEL MEMBER LUDERER: So the final study
3 population, the data that I'll be presenting consisted of
4 51 women who completed sample and data collection for at
5 least two menstrual cycles. So two of those women had two
6 cycles of data and the remaining 49 women had three cycles
7 of urine samples available for analysis of hydroxylated
8 PAHs. We actually have many more menstrual cycles for
9 which we have not been able to analyze the hydroxylated
10 PAHs, but we started with the three, so -- and with -- the
11 metabolites that were measured were nine hydroxylated
12 metabolites of naphthalene 1 and 2, a hydroxy naphthalene
13 1-hydroxypyrene, 2-, 3- and 9-hydroxyfluorene, and 1-, 2-,
14 and 3-phenanthrene.

15 And these are measured here by the CDPH
16 Environmental Health Laboratory using isotope dilution gas
17 chromatography high resolution mass spectrometry.

18 --o0o--

19 PANEL MEMBER LUDERER: So this table shows the
20 detection frequencies. And as similar as with NHANES,
21 these are detected at very high frequencies in these women
22 here from Orange County. 1- and 2-naphthalene were 100
23 percent in our sample, 148 urine samples from 51 women.
24 We had sample detection frequencies greater than 99
25 percent. You can see for two of the phenanthrene and two

1 of the fluorene metabolites. And samples that had the
2 lowest detection frequencies were still above 90 percent
3 detection frequency.

4 --o0o--

5 PANEL MEMBER LUDERER: These two graphs show the
6 geometric means for the Women's Health and the Environment
7 hydroxylated PAH measurements. I have naphthalene
8 metabolites separated out on the right in a separate
9 graph, because the concentrations are very different.
10 These are in nanograms per gram of creatinine compared --
11 since our urine samples were collected between November of
12 2010 and July of 2012, we're comparing them to the NHANES
13 2011/12 geometric means for women.

14 And what you can see, just the general pattern
15 here, is that in general these Orange County women had the
16 geometric mean concentrations were lower than the same
17 metabolites reported for women in NHANES during this
18 period. But, of course, women includes -- also in the
19 NHANES study includes a wider age range. So we weren't
20 able to compare just for the age range that we were
21 studying.

22 --o0o--

23 PANEL MEMBER LUDERER: This table shows the
24 correlations between the different PAH metabolites within
25 these urine samples of these 51 women. One, I think the

1 key points that I want to make here is that the
2 metabolites, if you look at 1-phenanthrene and 2- and
3 3-hydroxyphenanthrene, those are highly -- those were
4 among the highest correlations that we observed, which is
5 encouraging, since we -- they are metabolites of a
6 parent -- same parent compound. And for fluorene, we see
7 a very high correlation between 2- and 3-hydroxyfluorene
8 and somewhat lower for 9-hydroxyfluorene.

9 You can see that in general all of these
10 metabolites, even for different parent compounds were
11 correlated with one another with the striking exception of
12 2-hydroxynaphthalene, which really had very low minimal
13 correlation with any of the other metabolites, actually
14 including 1-hydroxynaphthalene. So that's an interesting
15 finding, and we can talk a little bit about what the
16 reasons for that might be.

17 --o0o--

18 PANEL MEMBER LUDERER: Because we had this unique
19 opportunity where we had multiple repeated samples from
20 the same women, we wanted to look at measures of within
21 person variability, so one way of looking at that is
22 looking at intraclass correlation coefficients. And there
23 are various different ways of calculating ICCs. The idea
24 here is that a 1 would be a perfect correlation that
25 basically the three samples within women were identical

1 and 0 would be none.

2 And so what you can see here is that, in general,
3 the correlations were relatively low. They were not
4 extremely high for most of these metabolites, which if
5 we're interested in looking at changes within women, for
6 example, related to hormone secretion during different
7 menstrual cycles, it's actually helpful to have
8 variability, so that you can look at possible differences,
9 for example, an anovulatory versus an ovulatory cycle in
10 the same woman, how is that associated perhaps with the
11 PAH exposures.

12 --o0o--

13 PANEL MEMBER LUDERER: So what might be the
14 sources of PAH exposure in this population. We have -- we
15 know from other studies that the fluorene, phenanthrene,
16 naphthalene metabolites seem to be very strongly
17 associated with indoor air exposures. 1- & 2-naphthalene
18 are strongly associated with smoking. And we've done
19 preliminary bivariate analyses, and we also see that 1-
20 and 2-naphthalene, although we had a very low rate of
21 smoking, about 10 percent of the women smoked, they were
22 in bivariate analyses smoking was associated with 1- and
23 2-naphthalene, as well as with two of the fluorene
24 metabolites.

25 2-Naphthalene has also been associated with

1 traffic exposure and residents in an industrial area. So
2 we all know that southern California has a high -- has a
3 lot of traffic, and we've done some preliminary analyses
4 looking at commuting, and we do see associations with
5 commuting time with some of these metabolites.

6 1-Hydroxypyrene has been strongly associated in
7 other studies with barbecued and grilled meat consumption.
8 And we think that food -- in women who don't smoke, food
9 is definitely a major source of PAH exposure. We
10 unfortunately were not able to do food diaries for these
11 women. The one, not food exactly, beverage that we looked
12 at is we looked at coffee and tea consumption. And in the
13 bivariate analyses, we are seeing associations between all
14 of the phenanthrene metabolites, the 1-hydroxypyrene, as
15 well as some of the FLUO metabolites with coffee and tea
16 consumption actually.

17 --o0o--

18 PANEL MEMBER LUDERER: So to summarize, nearly
19 all of these Orange County women had detectable
20 concentrations of the nine hydroxylated PAH metabolites,
21 which is very consistent with the NHANES findings over the
22 years. The geometric mean concentrations in these
23 participants were lower than the geometric means for
24 females in NHANES for 2011 and '12. And eight of the nine
25 metabolites were highly correlated with one another, while

1 the 2-hydroxynaphthalene was minimally correlated with the
2 other OH-PAHs. And the metabolite concentrations were not
3 highly correlated across menstrual cycles within
4 participants.

5 --o0o--

6 PANEL MEMBER LUDERER: And so currently, we're
7 finalizing analyses of the associations between the
8 hydroxylated PAH metabolites and reproductive endocrine
9 endpoints. And we hope to be submitting that manuscript
10 soon. We have ongoing analyses of predictors of
11 hydroxylated PAH concentrations in these women. And just
12 throwing out there for discussion, since discussion is the
13 next item on the agenda, I think it would be interesting
14 possibly to measure 1 -- the 1-nitropyrene metabolites in
15 these samples and maybe to talk about other exposure
16 biomarkers of interest to measuring these samples.

17 --o0o--

18 PANEL MEMBER LUDERER: And I wanted to, of
19 course, acknowledge everyone that participated in the
20 study, my collaborators, and, of course, support from NIH,
21 as well as from the Biomonitoring California RFI. I'd
22 like to -- be happy to take any questions.

23 CHAIRPERSON BRADMAN: Just a quick review of the
24 agenda right now. We have 10 minutes budgeted for
25 questions from the Panel. But then following that, we

1 have a much longer period for discussion around this. So
2 maybe we should just limit it to informative questions
3 right now. And then we can have a deeper discussion that
4 would include all of the guest speakers and the Panel and
5 also opportunities for public comment.

6 PANEL MEMBER MCKONE: So these compounds -- these
7 are the lighter PAHs, right? So these are going to be
8 mostly volatile or not have a large fraction bound to
9 particles or could be doing some of this -- deposition
10 and remission, depending upon temperature and condition,
11 right?

12 PANEL MEMBER LUDERER: Yeah, that's right. I
13 mean, the other thing to keep in mind, I mean, these are
14 used as biomarkers not only of the parent compounds, but
15 also of the larger PAHs, which are not found in the urine
16 because there's such a strong correlation. I mean, as you
17 could see for these -- the four parent compounds that we
18 were looking at, but also with the exposure to the other
19 PAHs as well, which we can't really measure in the urine,
20 so -- and I should also add that in addition to inhalation
21 exposure being important for these, I also mentioned that
22 for the 1-hydroxypyrene, in particular, food is a major
23 source.

24 PANEL MEMBER MCKONE: Maybe this goes to our
25 discussion, but one of the things that comes up that were

1 -- for several of the PAHs is if you inhale them, right,
2 they go through your system, and they can actually bind to
3 a receptor before they get into the liver. Whereas, when
4 you ingest them, they go right to the liver first. They
5 tend to be more hydroxylated or they aren't prevented from
6 being -- I mean, there is this pathway that could keep
7 them, if you inhale them, you could keep them from being
8 hydroxylated, if they -- if they have a pathway of binding
9 to some protein receptor.

10 And I don't know how true that is for all of
11 them. I think that happens for naphthalene. There's been
12 some studies on the -- you know, the difference between
13 the first pass through the whole body before you get to
14 the liver versus the direct shot to the liver when you
15 take it in. I don't know if that's --

16 PANEL MEMBER LUDERER: Well, the liver
17 metabolizes these, but a lot of the target organs actually
18 metabolize the PAHs as well. And the ovary certainly
19 does, the lung. I mean, there's metabolism at the target
20 organ as well as metabolism in the liver. I can tell you
21 that with ingestion with oral exposure, the effects on the
22 target organ that -- you know, that we're interested in,
23 the ovary are very pronounced.

24 So there is a significant absorption of these
25 compounds through the gastrointestinal tract, and

1 metabolism to the reactive metabolites at the ovary,
2 despite the first pass.

3 PANEL MEMBER MCKONE: Well, I mean, that makes
4 sense, because they're both somewhat water soluble, but
5 there's lipid uptake. And, I mean, if they're bound to
6 lipids, they're still going to go into the gut. And these
7 have -- even though they're semi-volatile and they've
8 got -- they're probably dissolved in lipids and those
9 lipids are absorbed, right, so they're going to enter into
10 that pathway.

11 CHAIRPERSON BRADMAN: Dr. Bartell.

12 PANEL MEMBER BARTELL: Thanks for the
13 presentation. It was very interesting. I was actually
14 curious on one of the last slides where you listed what
15 you thought might be other sources to PAHs in the
16 population. You only mentioned the barbecued and grilled
17 meat consumption for one of the metabolites, which was, I
18 think, 1-hydroxypyrene, if I remember the name of that
19 correctly.

20 PANEL MEMBER LUDERER: So -- yeah, go ahead.

21 PANEL MEMBER BARTELL: And I was just -- I was a
22 little surprised, the Li paper, as you know -- may know, I
23 was one of the co-authors on that, involved a single
24 barbecue chicken dinner, and we saw 10-fold increase in
25 actually all of these metabolites just between pre- and

1 post-administration of this single chicken dinner. And so
2 I'm wondering just why it's singled out as only
3 contributing to that metabolite here, because I guess my
4 read just from these --

5 PANEL MEMBER LUDERER: They are -- yes, they are
6 all associated. I think that was the one that was the
7 most strongly associated in both of the studies. And so
8 that was why I highlighted that, but, yes, they are all
9 associated with exposure to barbecued and smoked foods.
10 And it varies somewhat depending on what the foods are and
11 what the method of cooking is as well, definitely.

12 PANEL MEMBER BARTELL: If you think -- I know
13 that you're sort of already mid-stream in this study.
14 Would there be any possibility to even retrospectively ask
15 participants about their frequency of consumption? I
16 don't think you'd get exact timing going back this far
17 now. But, you know, in terms of how often each person
18 barbecues, I think, you know, there's -- just a thing
19 about the statistics. I think there's some ways you could
20 even just incorporate that information to try to suss out,
21 you know, some of the differences across individuals and
22 within individuals over time.

23 PANEL MEMBER LUDERER: Yeah. I mean, that's
24 something that I would really like to plan into a larger
25 study. It was just something -- we tried to get some

1 funding to do it mid-stream while we were still in the
2 process of collecting samples to see if we could go back
3 and do that, but we weren't able to. But I am definitely
4 interested, because I think that is going to be a major
5 source of exposure.

6 PANEL MEMBER BARTELL: The serial sampling is
7 really nice here to see too. And again something I think
8 people have started doing in really just recent years.
9 And I think that's really important. Obviously, in an
10 epidemiologic analysis, it's actually useful to have that
11 difference as you pointed out across subjects over time,
12 if you're looking at short-term acute outcomes.

13 It becomes a challenge then if you're trying to
14 assess chronic outcomes from, you know, a limited number
15 of samples. But I think a lot of different lines of
16 evidence are converging on the utility of actual serial
17 biomarkers in the same individual so over time for a
18 variety of research purposes.

19 CHAIRPERSON BRADMAN: Dr. Quintana.

20 PANEL MEMBER QUINTANA: I thought your comment
21 that you see an effect of commuting very interesting,
22 because one thing Southern California has as an exposure
23 that you don't have some other places is spending a long
24 time in the car and often not just in the car, but on
25 freeways which are shared with big trucks. I think some

1 of the freeways are some of the most polluted in the world
2 with diesel, like the 710, I think.

3 And so I think it would be very interesting to
4 look at the 1-nitropyrene in those samples. If you
5 actually are seeing with all the other sources that you
6 mentioned already with diet, you're still seeing a signal
7 from commuting. We do know that in-cabin exposures are --
8 contribute sometimes the majority of a person's exposure
9 for that day, because of the small environment and the
10 on-road emissions.

11 So it does seem to be a very interesting finding
12 that you mentioned. It will be interesting to look at
13 other markers, especially 1-nitropyrene.

14 PANEL MEMBER LUDERER: Yeah. No, I definitely
15 agree. I was very excited by that preliminary finding
16 too.

17 CHAIRPERSON BRADMAN: Dr. McKone.

18 PANEL MEMBER MCKONE: I was actually quite
19 fascinated that your geometric means were lower. I mean,
20 that's -- were they significant? I mean, that's -- the
21 importance of a geometric mean is kind of the anchor point
22 of a distribution. And it's good. I mean, people look --
23 I mean, I don't -- so this is a very important point. It
24 means that it must be systematically lower if your anchor
25 point is lower.

1 Was it a bit -- quite a bit lower, and do you
2 have a reason -- or a sense of why it might be lower?

3 PANEL MEMBER LUDERER: Well, you know, one thing
4 that I could positively say is that this is a fairly --
5 you know, the population in the part of Southern
6 California they were looking at, it is a fairly high
7 socioeconomic status area. I mean, there is traffic, but,
8 you know, I think it may have something to do with that
9 where people are living versus where most of the traffic
10 pollution is.

11 But I -- we're doing -- we're looking -- we have
12 data on where the participants' home addresses are, and we
13 have some work address information too. And so we're
14 trying to do some modeling looking at personal exposure -
15 and this is in collaboration with Jun Wu - to air
16 pollutants and to try to see how well that predicts the
17 biomarker concentrations we measured.

18 CHAIRPERSON BRADMAN: Dr. Quintana.

19 PANEL MEMBER QUINTANA: Not to keep harping on
20 smoking and cotinine, but don't forget that NHANES is the
21 whole U.S. And in California, we get used to our
22 smoke-free everything. And it really is not the case in
23 many other states. And so I'm -- I would just hazard a
24 guess that some of that difference is exposure to even low
25 level tobacco smoke.

1 PANEL MEMBER MCKONE: Yeah, that was my
2 suspicion. I mean, I just wanted to throw it out there,
3 because it would be not only a difference in smoking, but
4 also restrictions of smoking in most environments. It
5 also could be diet too. I mean, we have
6 somewhat -- particularly in Orange County, I think there's
7 a sense of eating a different diet. I don't know how much
8 you've looked at that, but that -- you know, there's
9 probably less red meat consumption in this population than
10 there is in the U.S. standard and intensely cooked food.

11 PANEL MEMBER LUDERER: I think that's likely
12 true, yes. And we do -- one of -- we do have data on
13 daily cigarette smoking for the women who smoked, but we
14 have very low numbers of women who smoked. And so I agree
15 that relative to the general population, I mean,
16 California I think is the second lowest rate only to Utah
17 in terms of female smoking, I think.

18 PANEL MEMBER QUINTANA: Just to clarify, I didn't
19 mean active smoking.

20 PANEL MEMBER LUDERER: But passive exposure too,
21 yeah.

22 PANEL MEMBER QUINTANA: I mean passive exposure
23 because a little bit here and there does really add up,
24 and it's noticeable in biomarkers. And then second-hand
25 smoke causes an increase in these PAH metabolites in the

1 NHANES data.

2 PANEL MEMBER LUDERER: Right. And we wanted --
3 we do -- one of the possible things we could look at in
4 the samples that we still have would be to look at
5 cotinine. That was something we wanted to do, but we just
6 couldn't do it with the pilot study funding.

7 CHAIRPERSON BRADMAN: So if there aren't any more
8 specific discussions for Dr. Luderer, I want to then kind
9 of open up for a broader discussion of the presentations
10 we've had this morning, including all of the speakers.
11 And I think we welcome input from staff and we'll also
12 have opportunities for public comment. The goal here is
13 really to think about what's been presented and what
14 implications there are for additional biomonitoring work
15 and perhaps health outcomes research we can do related to
16 this that might inform the use of some of these
17 biomarkers.

18 I should just say as kind of a personal
19 perspective, and I've said this before, given how
20 controversial and challenging the issues around diesel
21 regulation have been in establishing a standard and the,
22 you know, real economic implications for the trucking
23 industry and commerce, I think there could be a real
24 opportunity here to look at diesel exposures and kind of
25 address our prioritization of diesel as a high priority

1 biomarker for the Program, and perhaps provide a service
2 to the State by providing information about where the
3 regulation is working and the importance of health
4 benefits versus cost related to commerce, and perhaps
5 ultimately come up with really a net win for the State.

6 And we have this time right now I think to talk
7 about this. And I know all of us probably have some
8 thoughts about where to go forward.

9 Dr. McKone.

10 PANEL MEMBER MCKONE: Well, it would be helpful
11 to me, I don't know about others, is that -- if we review
12 what's in our list and what's out, because, you know, our
13 list includes anything that's on NHANES, right, for the
14 State Biomonitoring Program.

15 I mean, one of the reasons we're having this
16 discussion is to also think about where we want to go
17 next. But I don't think we have to add any of the PAHs
18 that NHANES already does, because it's already on our
19 list, but the 1-nitropyrene is not, right? I mean, that's
20 the -- so one of the interesting things that comes up is
21 we're still struggling to find a good marker for
22 1-nitropyrene. And that one I found, you know,
23 particularly interesting that there's kind of a door
24 opening here and how much we should explore that.

25 But, in general, I think it also does suggest we

1 want to revisit more broadly where we're going with the
2 whole family of PAHs and various nitro-PAHs. Just a
3 thought.

4 CHAIRPERSON BRADMAN: I think actually you raise
5 some interesting points there. You're right, I mean, if
6 we want to -- we have already designated diesel as a high
7 priority. Can you -- Sara, can you confirm?

8 MS. HOOVER: Yes.

9 CHAIRPERSON BRADMAN: I think we basically said
10 that diesel exposure or markers of diesel exposure are --

11 MS. HOOVER: Yes.

12 CHAIRPERSON BRADMAN: -- on our priority list.

13 MS. HOOVER: Yes. Sara Hoover, OEHHA. I was
14 just trying pull up the footnote. Basically, when diesel
15 exhaust was listed, it was listed as diesel exhaust with
16 any bio -- you know, relevant biomarkers. So diesel
17 exhaust is what's listed, which means that we can choose
18 any biomarker that we wish to evaluate diesel exhaust
19 exposure. So that's not an issue that Tom was raising
20 about 1-nitropyrene. It's covered by the listing.

21 CHAIRPERSON BRADMAN: Right. And there's not
22 necessarily a need to list that particular compound?

23 MS. HOOVER: No, there's -- it's listed.

24 Basically, anything that we could identify as a reasonable
25 diesel exhaust biomarker is already listed. It's covered

1 by that listing, and we specifically formatted it like
2 that. I was just trying to pull up the -- I think we have
3 a footnote that explains it, which I'll pull out in a
4 second and read it to people.

5 CHAIRPERSON BRADMAN: So maybe the real question
6 for discussion today among the Panel and speakers and all
7 of us really is what -- given the information we have,
8 where can we go forward to kind of inform the Program and
9 the State about diesel exposure?

10 MS. HOOVER: Yeah, I'll just say, basically, this
11 was discussed when diesel exhaust was put on the list.
12 And the footnote simply says, "Diesel exhaust is a complex
13 mixture that contains many compounds, one or more of which
14 may be useful as an indicator for biomonitoring". So we
15 can choose anything.

16 And just to -- I mean, I think Asa has some ideas
17 for informal discussion questions. But to clarify what we
18 mean about next steps, we're really talking about
19 development of capability, you know, lab capability,
20 design of studies, how would -- you know, going to the
21 thing that you were talking about, Asa, regarding how we
22 can provide a service potentially, you know, in
23 demonstrating the effectiveness or maybe areas where it's
24 not effective, you know, the diesel regulations, finding
25 populations that might still be more highly exposed.

1 Those are the kinds of questions that would be
2 interesting.

3 Also, the whole discussion on the variability and
4 the half-life that seems like a really interesting angle
5 to talk more about. So you don't have a practical matter
6 before you today in terms of an official recommendation or
7 any chemical selection issue, because we've already dealt
8 with that. So it's really more about how do we go from
9 here?

10 CHAIRPERSON BRADMAN: Dr. Quintana.

11 PANEL MEMBER QUINTANA: I think some of the most,
12 you know, fascinating findings of today were looking at
13 the difference, even with 10 children, which appeared --
14 was significant, but was very promising. That difference
15 looked like it would be real if it were -- had more
16 samples, so -- and in the interest of full disclosure, I'm
17 a co-author with Dr. Galaviz and Dr. Simpson on the border
18 crossing study. But that did show that air
19 concentrations, differences in 1-nitropyrene were
20 correlated with urinary differences when they're measured
21 in the same individual.

22 So I think there's some pretty strong evidence
23 that this marker could be interesting. It was fascinating
24 to me how high the levels were in the children. And
25 again, we do know that children absorb more from the same

1 environment than adults, and they're very much at risk
2 from traffic exposures as shown by epidemiological
3 studies.

4 So we didn't talk about this specifically, but my
5 understanding was one of the issues that's been practical
6 in the sense of urinary volume, so we use 10 ml -- 100 ml
7 of urine for the border-crossing study, but I understand
8 from Dr. Simpson that it was only 10 ml that were used for
9 a study in the children, which is -- makes everything much
10 more practical.

11 DR. SIMPSON: I believe that is correct, but I
12 should defer to Dr. Bradman, that provided the samples.
13 I'm pretty sure he didn't provide 100 ml per kid.

14 CHAIRPERSON BRADMAN: Yeah, that's correct. And
15 that actually raises kind of a technical point that for
16 us, you know, we had archived samples from the study.
17 And, in fact, we even have some samples in these children
18 collected repeatedly on a daily basis over two weeks.
19 But, you know, these were young children three to five
20 years old, and we did not -- 100 ml was beyond, you know,
21 what we could spare, both in terms of maintaining our
22 biorepository and not using up samples. And two, we
23 just -- we didn't have that much.

24 So luckily, with 10 ml, we were actually able to
25 get quite good detection frequency. But definitely

1 there's potentially a challenge there. But certainly
2 getting 10 ml from kids is very feasible.

3 Dr. McKone.

4 PANEL MEMBER MCKONE: I want to probe a bit more
5 on this issue of the value of something like 1-nitropyrene
6 metabolites. And what's interesting is it isn't a very
7 long lived material, but for somebody who's exposed
8 continuously, it's just going to be there. I mean, it's
9 like -- I mean, when you're sampling something and there's
10 a lot of variation, you probably -- you're probably going
11 to see the baseline all the time. And then you're going
12 to see a lot of variability, because there's peaks going
13 up and down. I mean, that's a point we talked about with
14 Dr. Bartell.

15 And I'm comparing the miners and the children,
16 right, it really is interesting that the miners are lower,
17 even though you would expect they get some short-term high
18 exposures, but they may not persist well. And I know
19 we're not supposed to know where this is, but I figured
20 out where that mine is.

21 (Laughter.)

22 PANEL MEMBER MCKONE: And I've been to that part
23 of Montana, and it's absolutely beautiful air. There's
24 not a lot of diesel exhaust. So it really reveals the
25 importance -- you know, in some small scale for me it's a,

1 well, you could have a high exposure for a short period of
2 time as a worker, but what's really going to show up in
3 your urine and what really may matter is your baseline,
4 what you're at all of the time.

5 And if you're in really pristine air of Montana
6 with not a lot of diesel exhaust around, most of the time
7 your home is probably pretty clean, then you might see
8 that kind of effect. Because the children in Oakland near
9 880, that's a pretty heavily -- pretty heavy
10 concentrations of all kinds of automobile and diesel
11 exhaust in that area.

12 So anyway, for me, it kind of brings out maybe we
13 can start using this -- this contrast to say well, you
14 know, what doesn't make sense?

15 CHAIRPERSON BRADMAN: Dr. Quintana.

16 PANEL MEMBER QUINTANA: Just to follow up very
17 quickly. It was also interesting that in Dr. Galaviz's
18 study that these are people living in a fairly urban
19 environment, but adults, and the absolute levels in the
20 urine were very similar to the children's as well. And
21 having been in that environment, I would suspect the
22 levels are higher if you're standing in line at the
23 U.S./Mexico border and in Tijuana with the lack of
24 emission controls.

25 So again, we may be getting at children absorbing

1 be more per kilogram of child, as well as exposure
2 differences. And that's extremely interesting from a
3 progressive point of view.

4 PANEL MEMBER MCKONE: Yeah. Well, just to -- so
5 I -- and again, others probably want to come in, but I
6 think it is pointing to the value of a much larger study.
7 I mean, we do expect there to be temporal and spatial
8 variability. You know, the spatial, particularly about
9 where your baseline is. But if you have enough subjects
10 and you're careful in the design of this, you could
11 actually begin to learn how to use that to move toward a
12 more predictive model. So it does speak to the -- I mean,
13 I think there's -- like the door is opening and some light
14 is coming in. And I think the best way to open that door
15 more and get more light is to figure out a more systematic
16 way to get all of the variability in there, and then learn
17 how to use it to our advantage, as opposed to throwing up
18 our arms and saying, it's uncertainty. I mean, if you
19 understand your variability, it's not uncertainty.

20 PANEL MEMBER BARTELL: I agree entirely. I just
21 wanted to kind of think about the big picture a little bit
22 here too in terms of, you know, where the State
23 prioritizes efforts. I would actually say, even though
24 it's early in the development for 1-nitropyrene, I'm very
25 enthusiastic about the possibility, just because in theory

1 this should be a much more specific marker of diesel
2 exposure.

3 And if what we're really trying to get at is
4 diesel exposures then we want a specific biomarker.
5 Certainly, PAHs can reflect traffic exposure, but they
6 also reflect a lot of other things as we've talked about,
7 like smoking and diet. And that makes it very difficult
8 to suss out for biomonitoring data what those mean in
9 terms of, you know, effectiveness of interventions and
10 regulations or decreases in one particular source.

11 And I think that's particularly true if there are
12 questions about the extent to which diesel actually
13 contributes to each of these PAHs, which I think we've
14 talked about a little bit today. There's some debate, I
15 guess, in the literature about that, but at least some
16 evidence that in some cases that smoking and dietary
17 exposures may actually be more important.

18 And so I'd hate to sort of have OEHHA putting a
19 lot of effort into PAHs to try to, you know, capture
20 diesel exposure when that may miss the target. And maybe
21 we're already beyond that and already thinking -- already
22 thinking in those terms. But I think for me that's one of
23 the really exciting things about maybe trying to -- even
24 though they're earlier in their development, maybe more in
25 their infancy in terms of development of the science of

1 the newer biomarkers, like 1-nitropyrene. I think that's
2 a reason to actually put some effort and resources into
3 trying to bring those to maturity.

4 CHAIRPERSON BRADMAN: Dr. Luderer.

5 PANEL MEMBER LUDERER: I just really want to
6 echo, I mean, I think it's very exciting that the
7 1-nitropyrene is so relatively specific for diesel. And
8 that we can, using, you know, this biomarker, begin to
9 sort out exposure to diesel from all the other exposures
10 to sources of combustion that really play a role in the
11 other PAH biomarker measurements. I think it's also
12 though, I think, would be useful to measure them in the
13 same people and in the same samples, because I think that
14 would help us to start to get a handle of what are the
15 different sources of exposure in addition to, you know, to
16 the other -- in addition to the diesel exposures, what are
17 other sources that are driving some of these PAH
18 metabolites, the hydroxylated PAH metabolites. And I
19 think beginning to dissect the diesel component versus the
20 other component would be very interesting and valuable to
21 do for the other PAHs as well.

22 CHAIRPERSON BRADMAN: I think we've -- I'll make
23 one comment then Dr. Quintana. I think we've mentioned
24 this before in the setting here, that we have some
25 opportunities in California. We have almost a natural

1 experiment. For example, in the Bay Area, we have
2 Interstate 880, which is a designated heavy truck route,
3 and then we have 580 about two miles away, which also gets
4 heavy vehicular traffic, but relatively low truck traffic.
5 And we have a similar situation, I think with 710 and
6 perhaps some other highways in Southern California.

7 So we have some opportunities to test some
8 hypotheses about the importance of 1-nitropyrene. And
9 then, of course, maybe with the -- any limited existing
10 data we have, perhaps if we were to measure, for example,
11 1-nitropyrene in Dr. Luderer's samples, we have a few from
12 Oakland now in children, we could link that to truck
13 traffic data.

14 For the Oakland kids, we did have traffic density
15 information. But from the data sets we had available,
16 we're not able to take out -- you know, to really estimate
17 truck traffic independently of car traffic. So it seems
18 like that's maybe another step, if we have enough samples
19 in that.

20 And I'm curious, maybe Dr. Simpson you know of
21 other studies around elsewhere where they have tried to
22 specifically separate, you know, truck traffic or diesel
23 traffic from general passenger, car, gasoline based
24 transportation?

25 DR. SIMPSON: So I confess I'm not aware of any

1 studies that have tried to do that using biological
2 monitoring. There's certainly been a lot of work done
3 using regression type techniques. So looking at
4 predictors of car versus truck traffic on roadways and
5 looking at things like relative contributions of nitrogen
6 oxides versus black carbon versus ultrafine particles and
7 things like that as predictors of exposure. And then
8 using those air measurements and trying to associate them
9 and epidemiology or cohort studies with different, usually
10 acute, but also some chronic disease endpoints -- outcomes
11 to try and differentiate the role of diesel traffic versus
12 regular gasoline vehicle traffic.

13 CHAIRPERSON BRADMAN: Dr. Quintana and then Dr.
14 McKone.

15 PANEL MEMBER QUINTANA: So I guess I have a
16 practical question for Dr. Bradman and the Panel. So if
17 we were going to move forward with it, I guess I haven't
18 heard from the laboratory people in terms of just the
19 technique and how they feel it would be doable or not
20 doable. So I'm not sure if the laboratory people want to
21 comment on that aspect of it. And also, it seems like I'm
22 hearing from the Panel should we be looking for
23 interesting populations to study, either within the ones
24 that have already been biomonitored or looking outward
25 within California, for example. I believe that USC

1 Children's Health Study has done some work on regression
2 modeling for the truck versus car traffic, and have some
3 archived samples, I believe.

4 So I guess I just have a practical question of
5 where -- how do we proceed from here, if you could give us
6 any direction, Dr. Bradman, or others?

7 PANEL MEMBER MCKONE: Before we get to that
8 level, I had a thought which was kind of along this line,
9 but it's also -- we basically have a sense that
10 1-nitropyrene might be a pretty good marker. And, I mean,
11 one of the -- but it might not be perfect, and there's
12 going to be confusion and variability. And one of the
13 things about information or information theory is that if
14 you can get one reasonable good insight, and even a second
15 lousy insight, it's more powerful than having one alone.
16 Actually, it really enhances -- you know, this is the
17 whole thing of group solutions of problems. Two people
18 who don't know what they're doing, who work together, can
19 get a lot farther than one alone who knows a little bit.

20 And I don't know -- you know, I mean, we've had
21 this concern that there are markers of diesel exposure
22 that aren't really good, and we weren't comfortable with
23 them, because -- and now we're starting to get a pretty
24 good one, but we might want to pull back some of the other
25 ones that we weren't really happy with because they may

1 help us triangulate little bit and get more power to the
2 one that needs -- I don't know what that marker is
3 offhand, but we might want to think about whether there's
4 a second.

5 MS. HOOVER: Hi. This is Sara Hoover OEHHA. I
6 just wanted to briefly comment on what Jenny asked. We
7 actually reversed our talks. We had our special session
8 in the morning. You're going to hear from EHL. It's the
9 first talk after lunch, and he will briefly -- Jianwen
10 will briefly touch on the status of method development for
11 1-nitropyrene.

12 So the short answer is yes the Program is
13 pursuing it. So again, in terms of talking about it
14 today, we -- actually, at the -- you may recall in your
15 materials we sent around the discussion from November
16 2014. At that time, the Panel recommended that the
17 Program pursue trying to measure metabolites of
18 1-nitropyrene. And that's definitely still the intention
19 and the goal.

20 There's just resource issues and equipment issues
21 and staffing issues, that kind of thing. But that's being
22 pursued and Jianwen will talk about it in the early
23 afternoon. So I -- but I liked your idea a lot, what you
24 highlighted about populations, you know, study design
25 issues. Asa and I had talked about just brainstorming

1 some design questions. I think you could just continue
2 along that path for this discussion, and then you can talk
3 again about any method status issues after Jianwen's talk
4 in the afternoon.

5 CHAIRPERSON BRADMAN: And to follow up on that,
6 it seems like just from the discussion we've had a little
7 bit so far, there's kind of some general feelings that,
8 one, if there's studies with existing samples and data out
9 there, there might be an opportunity to do new
10 measurements on archived samples, which could answer some
11 of the questions or address some of the questions we have.
12 And then the next -- another piece would be what other
13 kinds of new studies to do? But whether that would be
14 exposure validation or perhaps it could be, you know,
15 biomonitoring exposure study related to, and including an
16 epidemiologic component. And then related to that is, you
17 know, what communities in California should we consider
18 studying?

19 You know, one idea that has come up in discussion
20 is using CalEnviroScreen. And that includes measures of
21 air quality. So we have actually -- you know, I believe
22 EnviroScreen, we've been using it, it's down at the census
23 tract level, but in some of those criteria, we can even go
24 down -- drill down a little bit farther, but it's really
25 an amazing resource that includes, you know, a lot of data

1 analysis across the state. And I think that could present
2 a real opportunity to identify populations, to perhaps
3 incorporate into a study or to do other kinds of
4 monitoring.

5 So maybe that's something we should really talk
6 about is, you know, what kind of communities should we
7 focus on and what would be most beneficial to the Program
8 in terms of where to go? And again, I still want to keep
9 in mind this idea of, you know, given the investment in
10 this state and on the private sector of trying to reduce,
11 you know, diesel exposure, can we show that there's been
12 some, you know, benefit from that investment?

13 I think both of you have comments, Dr. Luderer
14 and Dr. Quintana.

15 PANEL MEMBER LUDERER: Well, I was just going to
16 follow up on the -- being able to show the public health
17 benefit of the changes in diesel engines and exposures to
18 diesel-related toxicants. I think that it would be really
19 nice if we could try to identify archived samples that are
20 in an area -- geographic area, let's say we're talking
21 about a place where we would potentially find high
22 exposure, such as the freeways we were talking about with
23 high truck traffic, or, you know, the Oakland children
24 perhaps, who -- where we could have samples that were
25 collected before the decline started, because I think it

1 was 2009/10 when we really started to see dramatic changes
2 in the fleet.

3 Someone can correct me who knows this more than I
4 do, but that would be, I think, really exciting to be able
5 to show, you know, within the same geographic area, the
6 same community, possibly before, and then continued -- you
7 know, repeated measures, not within the same people
8 necessarily, but within the same general population to
9 really try to look at how that is impacted exposures to
10 diesel exhaust with the changes in the engines and the
11 truck fleet, et cetera.

12 CHAIRPERSON BRADMAN: Thank you. Dr. Quintana.

13 PANEL MEMBER QUINTANA: Yeah. So there may be
14 also populations to do with goods movement at ports, so
15 that's another big source of diesel. And I'm thinking of
16 the Port of Long Beach, which had mandated reductions.
17 Although we've been hearing the New York Times -- LA Times
18 about how they've not been carried out to the extent at
19 which they had planned, but -- and I'm not aware if there
20 are archived samples, as you say, before and after.

21 I think one of the most exciting uses of the
22 NHANES national data was showing longitudinal effects of
23 policy changes, and even using the example of secondhand
24 smoke, you know, reductions of more than two-fold between
25 1999 and 2010 in national exposure to, you know,

1 secondhand smoke.

2 And so I think a very strong use of this data is
3 showing public health benefits, showing reductions that
4 work, and I would support that very much.

5 DR. GALAVIZ: Can I say something?

6 CHAIRPERSON BRADMAN: Absolutely. This
7 discussion is open to speakers.

8 DR. GALAVIZ: Vanessa Galaviz with CalEPA and
9 OEHHA.

10 I just -- so one of the things that I looked at
11 was some predictive variables. And one of the predictive
12 variables that was significant was season. So in the
13 wintertime, concentrations for both 1-NP and urinary
14 metabolites were higher than in the summer, so just one
15 thing to account for for next steps.

16 CHAIRPERSON BRADMAN: So I think the -- another
17 comment down here? No. Okay. So why don't we -- it
18 seems like we have a slight pause. And I think now would
19 be a good time for any public comment that -- related to
20 any topics we've talked about this morning?

21 So have there been any submissions for public
22 comment?

23 MR. JACOB: Sorry. Tom Jacob with the Chemical
24 Industry Council of California.

25 I don't have a dog in this hunt, but have been

1 fascinated by the discussion. I just had a question for
2 Dr. Simpson. Relating to your mine data, I thought you
3 mentioned something about respirators. And I'm just
4 wondering the degree to which the folks at the mine face,
5 in particular, would have actually been -- would have
6 actually been experiencing exposure levels anywhere
7 comparable to the ambient levels of it.

8 DR. SIMPSON: So there was only one task within
9 the mine, where it was mandated that the workers were
10 supposed to wear respiratory protection as part of
11 becoming compliant with the lower MSHA standard for diesel
12 particulate. A lot of the vehicles had emission control
13 technologies on them, and a lot of them had enclosed cabs
14 with HEPA filtration. And so the measured exposures on
15 those workers would have been reduced due to those
16 emission controls.

17 There was one type of vehicle where they were not
18 able to do that. And those workers had to wear
19 respirators. And so for specifically that group of
20 workers, the personal air exposure measurement would have
21 been -- or the relationship between that and biomarker
22 would have been confounded by the extent to which they
23 used the respirators and how effectively they used them.

24 So we did ask about that. In the questionnaire,
25 we asked them to identify if they used a respirator and

1 how much of the time that they were exposed to diesel
2 exhaust. They used it. And that was -- I believe it was
3 one of the variables that we included in the predictive
4 model.

5 CHAIRPERSON BRADMAN: We have some additional
6 public comments. The first being from -- I see who has
7 the microphone Nancy Buermeyer from the Breast Cancer
8 Fund.

9 MS. BUERMEYER: Thank you very much. I just
10 wanted to make a couple of points. First of all, we as --
11 we, as an organization, share the enthusiasm of the Panel
12 and the Program of being able to find a way to track these
13 exposures in connection to so many different health
14 impacts including breast cancer, specifically with BAP. So
15 thank for the work that all of you have done to pioneer
16 these techniques.

17 The thing I wanted to call out, and you've got --
18 and the Panel sort of talked around it a little bit, but
19 the implications of Dr. Simpson's research around the sort
20 of cumulative exposure or cumulative presence, if you
21 will, of the metabolites over a four-day period that's a
22 discrete exposure, and what the implications of those
23 increases over time are for the folks who are chronically
24 exposed, particularly the children.

25 So like what's the pathway of exposure for the

1 children that are living near 880 or some of these other
2 places, given what you've found with those sort of
3 four-day exposures?

4 And the implications are pretty sobering, and I
5 think something that we would be interested in looking at.
6 I don't know how you look at it, except take children who
7 move from Montana to, you know, Oakland and sort of track
8 them over time from the moment they get there.

9 But anyway, I just wanted to pull that out as
10 something that is very concerning, I'm sure, for all of
11 us. And, you know, the environmental justice implications
12 for this kind of research are significant. And as a
13 person who does policy, the ability to show the impact of
14 policy is one that we're always looking for, and I think
15 this is ripe for that. So thank you all for the work that
16 you're doing.

17 CHAIRPERSON BRADMAN: Then our next comment is
18 from Veena Singla from the Natural Resources Defense
19 Council.

20 DR. SINGLA: Thank you. Good morning. Veena
21 Singla with the Natural Resources Defense Council. I
22 wanted to second, third the appreciation of the work that
23 was presented this morning, and to say that we also agree
24 that it's very -- the Panel kind of discussed the need to
25 move forward from the kind of pilot phase and into actual

1 implementation of these techniques for biomonitoring of
2 communities.

3 And I would agree that the research should be
4 focused on some of the aspects that are needed to move
5 these techniques forward into actual implementation,
6 because it would be very, very valuable for communities.
7 And also to second what one of the Panel members said
8 about looking at the Port of Long Beach and Los Angeles as
9 a potential place to look at if there's archived samples,
10 because I know our Santa Monica office has been very
11 involved with both of those ports and the development of
12 their clean air action plans.

13 And I'm not -- since I haven't been directly
14 involved with that work, I'm not sure about the exact
15 emission reductions that have been achieved, but it is my
16 understanding that there have been significant emission
17 reductions achieved at both of those ports, and that those
18 could be good communities to investigate for looking at
19 the policy effectiveness.

20 CHAIRPERSON BRADMAN: Do we have any --

21 DR. FLESSEL: Hi. My name is Peter Flessel. I
22 used to attend these meetings all the time, but this is
23 the first one in a long time.

24 I thought I would just make sure we hadn't thrown
25 out the low molecular weight hydroxy nitroaromatics. And

1 I was curious to see whether you saw any in your searches
2 for metabolites, in particular because of what Dr. McKone
3 said about having two dumb people do a little bit better
4 than one smart person. And maybe another marker from the
5 low molecular weight nitroaromatics that apparently are
6 there in two or three orders of magnitude greater
7 concentration.

8 DR. SIMPSON: Thank you for that comment. So as
9 you indicated, the nitropyrene metabolites are present in
10 very low concentrations. In order to measure them
11 reliably, we used a technique that basically shines the
12 light specifically on those compounds. And so we only see
13 the things that we're looking for.

14 That technique doesn't allow us to look at the
15 low molecular weight hydroxy nitroaromatic compounds. And
16 I haven't seen recently any additional work that's been
17 done on the literature that's -- that has continued to
18 explore those as a possibility. That's certainly a
19 potential area of research for folks to look at with
20 different techniques. But the method that we were using
21 was blind to the compound that you mentioned.

22 CHAIRPERSON BRADMAN: Do we have any email
23 submissions for the public comment?

24 DR. PLUMMER: No.

25 CHAIRPERSON BRADMAN: Well, so we still have --

1 we're running a little bit early, so we still have more
2 time for discussion here. And I'm wondering maybe if we
3 can kind of distill from this discussion some concrete
4 recommendations. I know it's not our -- we're not making
5 decisions here, you know, any formal decisions. But to
6 summarize so far, it seems like, one, there's enthusiasm
7 about 1-nitropyrene as a metabolite. And we'll hear more
8 about the laboratory capabilities.

9 Two, maybe there should be kind of a RFI or kind
10 of maybe formal attempt to understand what kind of studies
11 and archived material might be out there that could be
12 used at relatively low cost to inform the science related
13 to diesel and 1-nitropyrene.

14 And then the other is to perhaps conduct new
15 studies, and then maybe a question more for discussion is
16 do we want to consider those studies in terms of exposure
17 and health impacts and/or consider them also as perhaps
18 representative of exposure, and as a way to show trends
19 related to regulation. And those are kind of two
20 different purposes, and they can overlap at some level,
21 but they also could conflict.

22 So maybe it might be useful to have some
23 discussion there about what would be more of a priority or
24 how to weight them?

25 Dr. Quintana.

1 PANEL MEMBER QUINTANA: I had a couple of
2 follow-up points. In terms of practical issues in
3 proceeding, the variability in the markers has been
4 brought up, and also the -- adding more, even if they're
5 dumber markers. In this particular case, it might be
6 looking at other PAHs, as well as the 1-nitropyrene,
7 either oxy or nitro or parent PAHs in the same samples to
8 see if they add any information. So that's some of the
9 questions.

10 But I just want to point out something that I
11 think Dr. Galaviz brought up, which was in her data that
12 the sum of the metabolites was a bit more predictive than
13 individual ones. And so if people have varying metabolic
14 differences, they might go one pathway versus another.
15 And it's been seen for other compounds, sometimes the sum
16 of the metabolites can be more accurate than perhaps
17 fixing on one, and so -- but it makes a lot of difference
18 to laboratories, if they're measuring one of them versus a
19 lot of them.

20 And so that's a non-trivial point to maybe think
21 about as we go forward, should we ask them to just focus
22 on, you know, the 8-OH one or should we, you know, have
23 four of them that they're doing and then add them up, and
24 see which one is better? It probably has some practical
25 implications for the people in the laboratory. And also

1 for urine volume, I believe that maybe that it would take
2 more urine to do more metabolites.

3 So just kind of a minor point, but it might help
4 address those issues of variability, and so it may be
5 worth doing, even though it's difficult. And the other
6 question was to do with the other point. It was to do the
7 CalEnviroScreen, you brought up using this tool to inform
8 perhaps a selection of populations. And I believe that
9 the later versions of CalEnviroScreen, Dr. Galaviz
10 included traffic density in the metric, is that correct?

11 DR. GALAVIZ: Correct.

12 PANEL MEMBER QUINTANA: Yes, they did include
13 traffic density as one of the variables that inform the
14 most disadvantaged communities. And so do we have any
15 archived samples that somehow map on to these communities
16 would be a comment to follow up on your question about
17 archived samples?

18 CHAIRPERSON BRADMAN: And, Sara, could I clarify,
19 does CalEnviroScreen have an indicator that's specific for
20 diesel?

21 MS. HOOVER: Yes. Actually, Vanessa you answer
22 that.

23 DR. GALAVIZ: Yes, there is a diesel particulate
24 matter indicator.

25 CHAIRPERSON BRADMAN: And how was that computed?

1 DR. GALAVIZ: So ARB actually computes this
2 indicator for us. And what they do is a modeling
3 approach. So currently, they have -- for example, they
4 include both off-ground sources of diesel as well as
5 on-ground sources of diesel. And based off of theirs --
6 those sources, they compute -- they do a model. And so
7 obviously, there are some limitations to that to a
8 modeling approach, but that's what they do.

9 CHAIRPERSON BRADMAN: And is it at the census
10 tract level or is it --

11 DR. GALAVIZ: Yes, it's at the census tract level,
12 correct.

13 CHAIRPERSON BRADMAN: It's at the census tract.
14 So I'm thinking of our study. We probably have most of
15 our samples collected within the same census tract, so it
16 would be hard to look at variability. But possible to
17 compare Salinas to Oakland.

18 DR. GALAVIZ: One thing like I -- you know, it is
19 a modeling approach, so obviously the further away you get
20 from having lack of data, you know, you're going to have
21 much more uncertainty. But for the traffic density, it's
22 much more -- it's not a modeling approach --

23 CHAIRPERSON BRADMAN: Right.

24 DR. GALAVIZ: -- so that might be a much more --
25 a better indicator to use.

1 CHAIRPERSON BRADMAN: Right.

2 MS. HOOVER: This is Sara. I just wondered,
3 Chris, did you want to address the issue of urine volume
4 for the sum of the metabolites?

5 DR. SIMPSON: Sure. So there -- I'll address two
6 points that Dr. Quintana raised. So in terms of -- I
7 think Dr. Galaviz shared data for four different
8 nitropyrene metabolites. The analytical method collected
9 data for all four of those compounds. And so the
10 incremental effort required by the lab to quantify four
11 rather than just one is probably not too great.

12 It's certainly the case that the data quality for
13 the acetylated compounds is the analytical variability is
14 quite a bit higher. And, in part, that's because those
15 analytes, at least in some of the populations, were much
16 closer to the detection limit, so the data quality is
17 maybe not as good. But since the method can collect
18 measurement -- data for all four of those compounds, I
19 think you're right that it makes sense to process that
20 data. And then in the subsequent data analysis, you can
21 figure out how useful those additional metabolites are.

22 CHAIRPERSON BRADMAN: Dr. Luderer.

23 PANEL MEMBER LUDERER: Hi. In addition to
24 identifying communities or geographic areas, you know,
25 using a tool like CalEnviroScreen to perhaps focus where

1 studies might be done, I think it would also be very
2 useful to identify maybe occupational populations that
3 could be followed. And it might be particularly
4 interesting, you know, things that come to mind would be
5 diesel mechanics, perhaps dock workers, you know, drivers,
6 bus drivers, you know, those kinds of populations with
7 high exposure to diesel exhaust, and where we can look at
8 occupational exposure and how the changes in regulations
9 and the fleet are impacting in occupational exposures as
10 well.

11 CHAIRPERSON BRADMAN: I agree that's important.
12 It seems like there's a number of partnerships really that
13 could be developed to look at this -- these issues in
14 terms of academic groups. I'm thinking of Rob McConnell's
15 group at USC that did a lot of traffic exposure, other
16 children's centers around the State. We have, of course,
17 our sister program at Berkeley that's working in Fresno
18 and looking at asthma.

19 It seems to me there's some real opportunities
20 here for both the academic and State and community groups
21 to work together on this issue. And again, I just --
22 I think there's some real opportunities here to understand
23 these exposures, and also answer real environmental
24 health, public health questions, which are often
25 challenging for those of us who work in this field.

1 Any more discussion?

2 We're running a little bit early, which is not a
3 bad thing --

4 (Laughter.)

5 CHAIRPERSON BRADMAN: -- but sometimes -- I don't
6 want to cut anything short. Sometimes you have to mull a
7 little bit before we speak.

8 Dr. Quintana.

9 PANEL MEMBER QUINTANA: So you said earlier when
10 you summarized where should we go from here? And I think
11 you mentioned should we ask for an inventory of kind of
12 samples we already analyzed and those partnerships, and
13 maybe an evaluation by the staff of how informative it
14 would be to analyze any of those samples that have
15 existing partnerships, is that what I heard you say?

16 CHAIRPERSON BRADMAN: Yes, yes.

17 PANEL MEMBER QUINTANA: As well as maybe
18 exploring new samples.

19 CHAIRPERSON BRADMAN: Right, right. I'm curious
20 actually about if there's any -- might be some samples
21 through the BEST projects through Kaiser that might be
22 geographically diverse, and include both high and lower
23 risk areas -- exposure risk areas.

24 DR. SIMPSON: Along those lines, and some of the
25 Panel members are probably more familiar with this than I

1 am, but the -- there are some existing large cohort
2 studies across the country that go back 10, 15 years in
3 time. I'm thinking, for example, of something like the
4 MESA study that has archived urine samples.

5 And given that the -- at least here in
6 California, the diesel regulations have already had a
7 substantial impact, in terms of reducing levels of
8 emissions at least, being able to look at samples going
9 back in time, and to determine whether the biomarker
10 levels were higher back five, ten years ago when the
11 emissions were higher, I think that would be a very
12 valuable contribution to be able to make to the State.

13 CHAIRPERSON BRADMAN: Related to the issue of
14 archive, since this came up when we used our samples, and
15 maybe Dr. She we can discuss this this afternoon, but we
16 mentioned earlier about sample volume, and we were able to
17 successfully, you know, use about 10 ml for the samples
18 from Oakland and Salinas, I'm wondering if there might be
19 room for, you know, improvement there. I had an
20 experience with CDC where they went from 4 ml to, you
21 know, 500 microliters, half a ml, for pesticide
22 metabolites. And I'm wondering if maybe with the progress
23 in mass specs that we might be able to bring the sample
24 volume down.

25 DR. SHE: Yeah. I look at the levels -- the

1 comparisons of PAH levels we found is most in 10 ppt
2 levels. That's our current method detection limit, use 1
3 milliliter of the urine samples or two milliliters.

4 With the hydroxy metabolite and 1-nitropyrene
5 look at the details around 0.1. So that's -- for our own
6 laboratory experience, we need to push down the detection
7 limit almost a thousand times lower. So that's maybe a
8 reason I think Professor Chris use 100 ml. So then we
9 only 10 times difference.

10 So with 100 ml, I think we will be able to do it.
11 To push down like pesticide levels is almost impossible
12 from what I can see. It's maybe with a new technology.
13 The machine Dr. Chris -- Professor Chris used the EPI
14 4000. We have EPI 5000, which might give us a little bit
15 of room, like a 10 times or five times more sensitive.
16 But we do not have so much experience as Professor Chris
17 doing it.

18 So that's a lot of the challenge, at least I see
19 for us, if we do it ourself. We definitely need to work
20 with Professor Chris to see we can push down our detection
21 limit to 0.01 ppt levels, which seem to be a lot of work.

22 CHAIRPERSON BRADMAN: I definitely appreciate
23 those challenges. When you look at the measurements, and
24 then we're talking primarily in the picogram range, these
25 are very low measurements in terms of concentrations.

1 So if there's not anymore discussion, maybe we
2 should break for lunch early?

3 MS. HOOVER: Yes.

4 CHAIRPERSON BRADMAN: Okay. So we have -- we
5 actually have, I think, an hour and a half scheduled for
6 lunch today, a little bit longer. Originally, we were
7 going to come back here at -- let me look at my schedule
8 here. We're going to come back at 2:30 -- 1:00 to 2:30.
9 So let's back that up and say we'll start back here at
10 2:00 o'clock, so we have -- yeah -- why don't we make it
11 1:45.

12 MR. HOOVER: Actually, yeah, this is Sara again.
13 And Laurel has just informed me that, of course, we have a
14 side lunch thing happening, and those lunches won't arrive
15 till 1:00. So, yeah, let's not get too much earlier. So
16 what did you propose?

17 CHAIRPERSON BRADMAN: Well, I would say 1:45.

18 MS. HOOVER: No, no, no. We're allowing an hour
19 and a half. So even if we start now, it would be -- the
20 earliest we'd come back is 2:00.

21 So we have actually an hour and a half for lunch
22 scheduled, not --

23 CHAIRPERSON BRADMAN: Right, we were thinking of
24 constrict a little bit, making it --

25 MS. HOOVER: No, no, no.

1 CHAIRPERSON BRADMAN: You don't want to do that?

2 MS. HOOVER: We can't constrict. There's plans
3 for the lunch that require an hour and a half.

4 CHAIRPERSON BRADMAN: Okay. So why don't we say
5 2:00 o'clock.

6 MS. HOOVER: Let's say 2:00 o'clock, but remember
7 before you break, read your announcements there.

8 CHAIRPERSON BRADMAN: Yeah. So we have to
9 address the issues around the Bagley-Keene rules governing
10 our discussion.

11 STAFF COUNSEL KAMMERER: Good afternoon. This is
12 Fran Kammerer, an attorney for OEHHA. Because this
13 Committee is subject to the Bagley-Keene Open Meeting Act,
14 I would like to remind you that especially since there are
15 luncheon events going on to refrain from discussing
16 actually committee matters during lunch. And if you have
17 a brilliant thought of one of the discussions, you had
18 this morning, which were obviously very interesting, hold
19 on to that thought, bring it back here. You'll obviously
20 have an opportunity to discuss it. As Sara said, after
21 the laboratory presentations, there will be ample
22 opportunity.

23 So once again, hold that thought, don't discuss
24 it over lunch, and come back here and talk about it and
25 have a good lunch.

1 CHAIRPERSON BRADMAN: And I think everyone here
2 is familiar enough, so you know what the options are.

3 We said we're going to start at 2:00. Let's have
4 everyone arrive like at five to 2:00, so we actually get
5 going at 2:00.

6 MS. HOOVER: Okay. Thank you.

7 (Off record: 12:28 PM)

8 (Thereupon a lunch break was taken.)

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

2 (On record: 2:00 PM)

3 CHAIRPERSON BRADMAN: So I think we should get
4 started. I guess we're -- yeah, so we're going to call
5 the meeting to order. I believe Dr. McKone will be back
6 very shortly. So I want to welcome everyone back from
7 lunch, and introduce our next agenda item, which will be
8 focusing on laboratory updates. And first up is Dr.
9 Jianwen She, Chief of the Biochemistry Section in the
10 Environmental Health Laboratory Branch.

11 So Dr. She, excuse me, we look forward to your
12 presentation.

13 (Thereupon an overhead presentation was
14 presented as follows.)

15 DR. SHE: Thank you very much. Thank you, Dr.
16 Bradman. Good afternoon and welcome to the members of the
17 Panel and audience.

18 This afternoon I will provide the laboratory
19 update for the Environmental Health Lab.

20 --o0o--

21 DR. SHE: This includes staff changes, method
22 updates, and ongoing projects, and our recent
23 publications. As you know, laboratory didn't provide an
24 update for last year. The last update we provided is in
25 March 2015. My quick update, we'll include all of the

1 things that we have done since March 2015.

2 --o0o--

3 DR. SHE: First, I'd like to introduce --
4 actually, I find out Ms. Su -- Ms. Su maybe already
5 introduced by Dr. Mike D. in November meeting. So Ms. Su
6 is visiting scholar from Shenzhen Food and Drug Control.
7 She will be here with us for half a year. Actually, now
8 next month she will be leaving. And she comes -- she have
9 a lot of experience working non-targeted analysis, because
10 non-targeted screening involved a lot of drug product, so
11 she has experience. And she currently working with us on
12 this non-targeted method development.

13 Another person I'd like to introduce is Dr.
14 Yu-Chen Chang. And Yu-Chen was with us a long time ago,
15 and then she rejoined us back about half a year ago.
16 She's also tasked with non-targeted method development.
17 We are very lucky APHL awarded us a fellow based on our
18 application we submitted last November. The fellow also
19 tasked by APHL, they want us to develop the new
20 methodology to do the non-targeted analysis. We are in
21 the process of interviewing the fellow.

22 Last on the items, we have two State limited-term
23 positions. For these two limited-term positions, we're
24 again in the process to recruit. I think that Dr. Chang
25 and Ms. Su in the audience. If you don't mind, can you

1 stand up, so we can welcome you.

2 --o0o--

3 DR. SHE: For the method update in last almost
4 one year, we focus on the following four methods: One is
5 the urine metal panels, and organophosphate flame
6 retardants, BPA analogs, and non-targeted screening.

7 --o0o--

8 DR. SHE: We changed the process of the urine
9 method. The change, I mean, right now we use basic
10 diluent, instead of acidic diluent. Why we do this is
11 because we find the mercury tended to stick on the system,
12 so you have the carry-over effect. If you run high level
13 samples, like sample, may be effect. It take us a long
14 time to clean up systems. Dr. Choi, he's in audience, he
15 make this change.

16 So with this change, the mercury wash-out time
17 was dramatically reduced, so that we also can improve our
18 throughput. And the other benefit is we can lower our
19 detection limits, and shorten analysis time I already
20 mentioned. And by the way, we also -- with this process,
21 we expanded our list of analytes to 13 chemicals.

22 --o0o--

23 DR. SHE: I have reported in the past we are
24 working on finalizing and validate OPFR method. For these
25 four OPFRs we mentioned here, you can see them. Right

1 now, I can report to the Panel the laboratory did a very
2 good result, and then we can start a project. So the next
3 project that we try to do is work with ECL together to
4 have some laboratory pilot samples. We try to do it.

5 --o0o--

6 DR. SHE: Another group of chemicals the
7 laboratory take on is BPA analogs, and mainly the para BPA
8 analogs. The structure is showed here. And then with
9 these five chemicals also we completed our method
10 validation. We can do them also similar to the OPFR, we
11 can get a very reliable result. These four extra
12 additional chemicals. We also plan to use this method to
13 do a pilot study.

14 --o0o--

15 DR. SHE: For the non-targeted analysis, in the
16 past, we reported to the Panel and the audience, EHLB is
17 database, which includes more than 600 compounds, which we
18 call the Toxic Chemical Finder. Toxic Chemical Finder
19 database is one database we found. The strategy we try to
20 test this new method with some chemical we already know,
21 and then find a new one. The reason we do it, we need to
22 make sure the new method at least can test the chemical we
23 already know for sure is there. So to do that, we scale
24 down a little bit. We build a more classical more
25 chemical-structure related database, for example, like

1 environmental phenols that structure related. We already
2 monitor some of them.

3 And then we can check how we're able to find new
4 chemicals. So the example I show here is based on
5 database we build around the benzophenones, like BP-3,
6 this group of chemicals. We have over 70 chemicals. We
7 build a database, and then we use this new method that we
8 run. We find 17 compound matched with our database. This
9 database include a lot of information. For example, they
10 include the accurate mass of molecules, isotope profiles.
11 So they also include the full scan spectra, plus a
12 secondary spectra, which is a MS/MS spectra.

13 So the match -- I mean, that 17 compound matched
14 with this four criteria, molecular mass, isotope profiles,
15 full scan spectra, plus MS/MS. But we confirmed that they
16 are the compound we suspect. We still need to purchase
17 standard. If that's a standard there, we can find out.
18 So the last step of confirmation, we buy some commercial
19 available reference materials, and then run that one with
20 this four MS criteria, and then match with the urine
21 sample again.

22 --o0o--

23 DR. SHE: For example, this is -- the first step,
24 we test our -- the chemical we already know. We have
25 traditional method, like BP-3, which we know how to do it.

1 collaboration we did with Kaiser. And also Measuring
2 Analytes in Maternal Archived Samples, MAMAS samples, and
3 traffic related air pollutant study, which I already
4 called it the Taxi Driver study. It is a collaboration
5 with UCLA. It is more related to this morning's topic.

6 --o0o--

7 DR. SHE: For the PETALS study, we -- from last
8 time our reporting, we -- at that time, we only measured
9 60 samples. Now we have finished the 414 samples.
10 Kaiser's PIs and her groups that did some studies.
11 They're local This multiple sampling from same subject
12 that look for the correlation or the ICC is kind of a
13 parameter.

14 Unfortunately, we cannot reveal what that data is
15 I think is still in preliminary stage. So we finish our
16 around 400 samples.

17 --o0o--

18 DR. SHE: The analyte for them is BPA, BP-3 and
19 the triclosan. For the MAMAS studies, EHL's role is more
20 like a feasibility study. Is this MAMAS samples collected
21 for the Genetic Disease Screening Program is a serum
22 samples. Are they proper, are they qualified to do the
23 metals?

24 We've managed kind of different analysis we
25 conduct. Our conclusion is at least for this six

1 compounds -- elements we listed here, this sample have a
2 severe contamination issues. So you can see let's use
3 chromium as an example on the most left five bars, the
4 bank one is a control, which is a plasma samples. Without
5 it, we put it into this serum collected tubes, so that the
6 value is real value. But once you put it into the sample
7 collection tubes, you think -- you see the value start to
8 go up. Five days we test. Nine days, we test. We test
9 16, 26 days.

10 And we notice longer they stay in the test
11 tube -- collection tubes, the value goes up a little bit
12 higher. So we conclude for this six elements maybe not
13 proper metrics, but the Program need to decide for the
14 remaining chemicals, analytes, they need to continue this
15 project or not.

16 --o0o.

17 DR. SHE: So for the so-called Taxi Driver Study,
18 the collaboration we did with the Professor Yifang Zhu at
19 UCLA. Basically, they collect some samples from 22 taxi
20 drivers, pre-shift, and post-shift. So you know according
21 to Professor Zhu, there are around 4,000 taxi drivers in
22 the L.A. area. And then a shift is about 4,000 people
23 work 72-hours per week. And the shift of the work time is
24 about six hours. So her goal is try to investigate
25 exposure to PAH and the particulate matters like the PM2.5

1 or other particulates.

2 And also try to see if this PAH level or
3 particulate matter have any relationship with lipid
4 peroxidation. So she measured a lot of indicators for
5 lipid peroxidation. So our EHL measured the PAH for her.

6 Totally, we measured the 232 samples. And second
7 goal for her is try to see if she considered this an
8 intervention study. She installed or changed the in-cabin
9 air filter with high efficiency in-cabin air filters.
10 Then she look for if this air filter have any impact on
11 the exposure levels.

12 She summarized all of this what she found and
13 sent it to the EHP for review. So hope that in the
14 future, if we have more interest, she can provide a more
15 detailed and more sound explanation for this study. I'm
16 able to address some short questions of that related
17 analytic part.

18 --o0o--

19 DR. SHE: So this diesel biomarker method
20 development is now go beyond a little bit of what
21 laboratories currently experienced with PAH. So as you
22 may remember in 2008, Dr. Peter Flessel he gave a group a
23 first presentation. Within his update, he mentioned that,
24 like Professor Chris mentioned, nitropyrenes groups, and
25 then also he mentioned the PAH, combined with IGE,

1 combined with valid times, the other possible approach.

2 And then later on, last 2014, Dr. Chris Simpson
3 gave a presentation and also Melanie Marty gave another
4 presentation on the same topics. Laboratory did a
5 little -- a preliminary preparation for these things,
6 since this is almost eight years, why we didn't make a
7 better progress.

8 One part is we concluded use 100 milliliter of
9 urine at that time kind of a challenge for us to deal
10 with. And we didn't put it as high priority. But since
11 2014, we established our direct contact with Dr. Chris
12 Simpson. He provide us 14 standards, very hard to get a
13 standard. I think he's the one -- he may be the only one
14 to have it. He gave us a very generous gift and provide
15 us 14 standards -- and 12 standards, which include some
16 parent compound of nitropyrene and the metabolite and the
17 isotope labeled standards.

18 So we have a foundation -- we also have the
19 instrument to take on. If the Panel and the Program task
20 us to do it, we can give exploratory work to see if we can
21 make the method work. And also, we are very happy Dr.
22 Chris Simpson is willing to help us to establish this
23 method.

24 Other -- on the other -- on the negative side of
25 this story is we -- CDC cut our fund last year. We lost

1 some experienced staff, even working on the PAH. Also, we
2 operated with some limited term staff. When the limited
3 term up, people needed to find a permanent or relatively
4 long-term positions that left us. We lost staff who has
5 experience in working on the PAH.

6 So right now, we're not completely good to the
7 point of zero, but we go halfway. We need to recruit
8 people to reestablish this kind of experience on the PAH.
9 And if we do the diesel, that's diesel on the PAH needed
10 to be considered together.

11 --o0o--

12 DR. SHE: Since March 2015, laboratory with the
13 collaboration with other staff published the method. The
14 first of five paper -- first paper is an editorial in the
15 Environmental Health Perspectives. They tried to also
16 spread the word, like China, you know, air pollution, they
17 wanted us to write an editorial for Chinese audience about
18 biomonitoring, so we did that. It's some more comment and
19 editorial literature. And to help the other government to
20 move on the program we are doing.

21 And next two papers majorly from our two previous
22 visiting scholars. The second paper is about benzene and
23 toluene exposure biomarker. You can receive from the
24 titles. And the third paper is another Shanghai CDC
25 visiting scholar. And he did some work in China.

1 And the number 4 paper is a report of a focused
2 study. We find a high level of BP-3. And this is the
3 Program's collaboration. And also, we work with Dr. Kim
4 Harley and also Dr. Asa Bradman's group. We did the
5 HERMOSA Study. This paper is in EHP in press.

6 And thank you for your attention, and I'm open
7 for questions.

8 (Applause.)

9 CHAIRPERSON BRADMAN: Okay. Thank you for that
10 presentation. We have a few minutes now for the Panel to
11 ask any questions or -- sorry. Again, we have some -- a
12 few minutes right now for any questions or clarifications
13 from the Panel?

14 PANEL MEMBER BARTELL: I guess I'm a little
15 concerned about what I'm hearing that, you know, the loss
16 of one or two people, you know, is that big a setback for
17 the laboratory. Could you give us -- did I understand
18 that correctly that you have basically a very small staff,
19 and so, you know, you lose some expertise if even one or
20 two people leave, make it difficult to come back to the
21 capabilities to measure was it PAHs, I think?

22 DR. SHE: Yes, for the PAHs specifically, we have
23 had some time -- some time when we lose staff, we have
24 enough overlap, we are able to train the staff and take
25 over. For example, we started with Dr. Bob Ramage. He's

1 the one that started the PAH. And then he promoted to --
2 he left us. And then we have Dr. Simon Ip, and Anthony
3 Zhou then take it on, so that didn't cause a leave for us
4 to maintain the capability.

5 But last year -- no, the year before, 2014, in
6 October, Dr. Simon left us. And then Anthony was
7 transferred to a different unit. And then this majorly
8 put us actually on hold about the PAH. And we still
9 maintain the machine, maintain the instrument, but
10 currently we do not have a staff to work on the PAH.

11 We also stopped the participation of the CDC PT
12 program, which is a checking performance. So this new
13 hire will try to address this, so at least we can first
14 step train this person to do the PAH, which look like a
15 little bit easier compared to the one with nitro
16 hydroxy-PAH, because the level is almost 100 times
17 difference.

18 PANEL MEMBER BARTELL: Yeah, just, I guess, a
19 comment. I mean I think you guys are doing a tremendous
20 amount of impressive work with, you know, a relatively
21 small amount of resources here. And I don't know what the
22 solution to this is, but I guess it's a concern to me to
23 hear that, you know, you're sort of operating right on the
24 edge of sustainability, because I think we'd all like to
25 see this become a clearly self-sustaining effort at the

1 State level.

2 DR. SHE: Thank you. Yeah, that's also exactly
3 one of our concerns.

4 CHAIRPERSON BRADMAN: Anyone else have a -- Dr.
5 Luderer.

6 PANEL MEMBER LUDERER: I just wanted to say it's
7 always -- it's really nice to hear an update on the
8 non-targeted screening, because that's certainly been
9 something that, as a Panel, we've been really interested
10 in -- you know, in having the Program -- in suggesting
11 that the Program pursue for a long time. So it's great to
12 see that you're making progress in that area with this
13 example of the benzophenones.

14 CHAIRPERSON BRADMAN: So that was a good
15 introduction to my question. I actually had a question
16 about the non-targeted screening. So I wanted to clarify,
17 was this an example where you had an unknown urine sample,
18 and you essentially screened it for a number of peaks, and
19 then went back and tried to identify them using, you know,
20 for example, mass spectra libraries? So in other words,
21 there was -- you were not -- you didn't have any prior
22 information on what was in the urine sample, and then
23 successfully identified the unknown peaks.

24 DR. SHE: Yeah. This is very generic urine
25 samples. We do not have the previous information on the

1 BP-1, which ones we found. But we know for sure must have
2 the BP-3, because most urine we work have BP-3 in the
3 past.

4 CHAIRPERSON BRADMAN: Right.

5 DR. SHE: So this actually you are right, so we
6 run minimum sample process steps to make sure all of the
7 chemical supposed to be there stay in the samples. And we
8 do not -- wanted to run a very strict sample clean up.
9 They may be gone. So then we run the samples through
10 the -- we call the data acquisition procedures, and then
11 we look for the database to find out. So this -- this is
12 a semi-target or non-target. We target it with a wide
13 database with a class of chemical. We didn't target with
14 individual chemicals. So from this class, over 70 of the
15 chemicals we find this chemical.

16 CHAIRPERSON BRADMAN: Right. And then would a
17 possible next step be to kind of compare the -- say, the
18 mass spectra and perhaps even the retention time against
19 some standards?

20 DR. SHE: Yes, that's a very good point. The
21 last step to confirm this MS information alone is not
22 enough, so the general approach scientific award -- except
23 they either compare like you said with the real retention
24 time and the real samples of MS characteristics. So that
25 you can see we did it with -- we did last step. We

1 confirm the in-house mass spectra library of commercially
2 available reference materials, which is a standard.

3 So basically for BP-1 we know for sure it is it,
4 because we have the real compound to compare. Another
5 accepted identification criteria is using an MR program.
6 We don't have it. Also, they require more sample to do
7 it. Sensitivity not as good as the MS, so we prefer to
8 buy standard to confirm it.

9 CHAIRPERSON BRADMAN: Right. I'm just curious,
10 are there any of these compounds that you identified where
11 there aren't standards available, so you could have a
12 situation where you might identify something likely
13 through, you know, a mass spec library, but really be
14 unable to confirm it?

15 DR. SHE: Yes, that's really like -- if the
16 light -- chemical itself was unavailable, and then you run
17 very new chemicals, that's -- two ways you can try. One
18 is you may find a substructure of chemicals, because
19 through the library search most of the times they matched
20 is a piece of it. They may not match the whole structure.
21 We call it substructure identification. So from that
22 substructure, you can guess what kind of group of
23 chemicals there are.

24 Also, the MS they have certain rules. The
25 chemical goes through the mass spectrometer just like go

1 atmospheric chemistry. They have certain ways to
2 breakdown. MS is very destructive. They provide about 20
3 EV, so some bonds may have broke down first. Based on the
4 bond energies, there's some theory to predict, okay, this
5 chemical. If you -- this bond broke down, you put a piece
6 back, you can guess the original structure.

7 Because the last is dependable, but it's with a
8 lot of experience you can try to propose a structure of
9 original chemical. And also some software program that
10 will predict the -- if you have this chemical, what kind
11 of breakdown you have. So from two paths, you can suggest
12 a structure for it.

13 CHAIRPERSON BRADMAN: Right. Okay. Thank you.
14 And I think this is -- like Dr. Luderer said, I think this
15 is a great beginning looking at untargeted compounds. And
16 think I'll probably look forward to hearing more about
17 that.

18 Anymore questions or clarifications from the
19 Panel?

20 Well, I think then perhaps it's time for Dr.
21 Myrto Petreas to provide an update on the Department of
22 Toxic Substances Control Laboratory work.

23 Thank you, Myrto.

24 (Thereupon an overhead presentation was
25 presented as follows.)

1 DR. PETREAS: Good afternoon, everyone. As Dr.
2 She said, it's been a year since you heard any update from
3 the labs, so I'll cover what we've done at DTSC.

4 --o0o--

5 DR. PETREAS: So basically I will cover changes
6 in staffing, where we stand with our major projects, which
7 is the California Teachers Study; our plans for other
8 upcoming studies, and as I usually do, I'll mention some
9 DTSC activities that benefit the Program indirectly.

10 --o0o--

11 DR. PETREAS: So the good news is that with the
12 2015 budget, we got funding, limited term, but we're able
13 to form the Biomonitoring Branch. And Dr. June-Soo Park,
14 over there, he's our new Branch Chief, which is great,
15 because now we can consolidate State and CDC funded staff
16 under him, and it's much more productive. So it's limited
17 term. We hope it will last and take advantage of that.

18 The bad news is that Dr. Erika Houtz, funded by
19 CDC for two years, decided to leave for better salaries in
20 the private sector. And we have been recruiting, even
21 made some offers that were turned down. So I think our
22 salaries are not very competitive. But we'll wait until
23 we find the right match. So we have two CDC funded
24 positions, now we only have one, but we're moving along.

25 --o0o--

1 DR. PETREAS: So a little bit about the
2 California Teachers Study. What I'm showing here is the
3 map with, I guess, addresses of the women who participate
4 at the time of joining the study. This is a very big
5 prospective study of over 130,000 women who are members of
6 the State Teachers' Retirement System.

7 --o0o--

8 DR. PETREAS: Overall, the Teachers Study, which
9 started in 1995, does an annual recontact process, and
10 there are also periodic questionnaires every two or three
11 years. In addition, there's access to databases, like the
12 Cancer Registry, and the mortality and hospitalization
13 databases to assess the health status of the participants.
14 So this big, big effort was initially supported by State
15 funds, but now they rely on federal and State research
16 grants. That's the overall study.

17 --o0o--

18 DR. PETREAS: So we got one of the research
19 grants from the Program a few years ago. And we're
20 working with the Cancer Prevention Institute of
21 California, which is the lead, UC Irvine, and City of
22 Hope. And for this study, we are recruiting and drawing
23 blood from a little over 1,000 cases and 1,000 controls
24 from the entire State.

25 We completed recruitment in 2015. It was very

1 slow. It took longer than we thought. Fortunately, we
2 got a no cost one-year extension for the study. And we're
3 really working hard to complete the analyses of
4 organochlorine pesticides, PCBs, PBDEs, perfluorinated
5 chemicals, and also thyroid hormones and lipids.

6 --o0o--

7 DR. PETREAS: So the major objectives of this
8 substudy is to screen for major predictors of PBDEs
9 looking at behavioral factors and sociodemographics, along
10 with variables of indoor and outdoor exposures. And the
11 second objective is to assess persistent organic
12 pollutants as risk factors for breast cancer.

13 So to do that, obviously we need to complete the
14 case control -- collect all of them and do the case
15 control analysis. What we plan is Dr. Reggy Reynolds
16 who's the PI from the CPIC, we'll plan to have her give
17 you a presentation more of the overall study and our
18 specific aims in one of the -- probably one or two next
19 SGP meetings.

20 --o0o--

21 DR. PETREAS: So in the meantime, where we are in
22 the lab as of this week, we have received over 3,200
23 samples, but we decided to stop at the numbers you see
24 here, everything that was extracted at the time. So a
25 little over 2,000 samples have been extracted for PFCs,

1 and almost 2,200 for the PBDEs and PCBs and pesticides.
2 And through each of these silos down, we're moving,
3 they're competing instruments and resources, but we're
4 making progress.

5 And so far, we have released data of 1,600 PFCs
6 down to almost 800 pesticides and PCBs. But the plan is
7 to catch up now and complete all the chemical analysis to
8 proceed with the statistical analysis.

9 --o0o--

10 DR. PETREAS: So while we're waiting for the case
11 control analysis, we also have some preliminary data that
12 we'll look into. First of all, in collaboration with the
13 City of Hope colleagues, we provided them samples that we
14 had characterized for the chemical content, and they used
15 a novel bioassay they have developed to estimate overall
16 estrogenic activities as a potential intermediate risk
17 factor for breast cancer.

18 This lead to a publication to which we are
19 co-authors. But more importantly, it led to another award
20 from the California Breast Cancer Research Program to look
21 at menopause as transition and window of susceptibility
22 for the promotion of breast cancer by environmental
23 exposures.

24 --o0o--

25 DR. PETREAS: And Dr. Chen from the City of Hope

1 is the PI. Under this award, we, the lab, are going to
2 analyze additional samples, about 150 serum samples for
3 PBDEs and 600 for PFCs. So that's where we stand with the
4 Teachers Study planning.

5 --o0o--

6 DR. PETREAS: We also looked at some data, and it
7 is very interesting. Residential proximity to solid waste
8 facilities in association with PBDE levels. So there's a
9 publication in press at ES&T coming out this week or so.

10 --o0o--

11 DR. PETREAS: Basically, we looked at controls,
12 932 participants without breast cancer, and accessed
13 information from the Solid Waste Information System
14 database from the State of California, identified the
15 close to 1,600 facilities that are utilized to receive,
16 store, separate, convert, transfer, or otherwise process
17 solid wastes.

18 So looking at where -- if you remember, we had
19 the location of the residences. Everything is geocoded,
20 so we know where people live and we know where these
21 facilities are.

22 So the interesting thing is that we found that
23 compared to participants who live more than 10 kilometers
24 away from a facility, those that live the closest, within
25 two kilometers, have 45 percent higher BDE-47 and BDE-100

1 levels. Those living between two kilometers and 10
2 kilometers had 35 to 30 percent higher.

3 So there's a gradient, and this is the first time
4 we see that. We know that PBDEs are really indoor
5 exposures. So it's the first time that we see that
6 this -- we know PBDEs are transferred by, you know, long
7 range transport, but how can this affect, you know, your
8 serum levels in your home is something which is really
9 intriguing.

10 And I should say that we have a seminar this
11 March 23rd. It's open. It's a webinar. People can
12 participate if you want to ask questions. Ruiling Liu,
13 the first author, will be presenting the work. I mean,
14 questions like is it socio -- is it a surrogate for
15 socioeconomic status. Those are different things that she
16 looked into. It's very interesting.

17 So if you -- you can use this slide to register,
18 if you want, or you can contact me for more information on
19 that. So that's with the Teachers.

20 --o0o--

21 DR. PETREAS: We're getting ready for the second
22 phase of the MAMAS, which is Measuring Analytes in
23 Maternal Archived Samples. Essentially, a biobank of
24 serum samples for pregnant women from throughout the
25 State. We have completed the analysis from the first

1 round, which were pregnancies of 2012 from Orange County
2 and San Diego Counties.

3 And now, we have received and we're ready to
4 start analysis of pregnancies that happened in 2015 from
5 different counties, north and south. For this study, we
6 plan to analyze PBDEs, PCBs, and pesticides in serum. And
7 for the first time, we'll use our expanded polyfluoro and
8 perfluoro chemical analysis to -- which we can encompass
9 35 analytes rather than 12 in serum. So we're eager to
10 see what this will look like.

11 --o0o--

12 DR. PETREAS: Another study that is very
13 interesting and starting, it's underway, is the Foam
14 Replacement and Environmental Exposure Study, or FREES.
15 It basically tries to answer the question, do exposures
16 change if sources are removed?

17 So in collaboration with UC Davis, the
18 Environmental Working Group, Green Science Policy
19 Institute, and the Silent Spring Institute, we're almost
20 done recruiting about 25 participants who are willing to
21 replace their furniture.

22 A side study, an additional, is to -- we're
23 attempting to recruit about 10 participants from
24 affordable housing, with the Green Science Policy
25 Institute helping subsidize the furniture replacement as

1 an incentive to participate.

2 The way the study is designed, we have
3 questionnaires, you know, time zero, and sampling at
4 baseline, and then at 6 months, 12 months, 18 months. The
5 idea is that once you remove your foam furniture to see
6 whether things change.

7 --o0o--

8 DR. PETREAS: So in the lab, we're ready to
9 analyze samples that we have from in serum, PBDEs in
10 serum, and OPFRs, the phosphorous flame retardant
11 metabolites in urine; in addition, PBDEs, other BFRs,
12 OPFRs in foam removed from the replaced furniture, and
13 also hand wipes at different stages again.

14 UC Davis will be analyzing the dust. And in a
15 week from now, we have a seminar that Rob Voss from CDPH
16 will discuss the study and give more information. Again,
17 this is something anyone can log in and register and
18 attend the webinar.

19 I should say that the FREES study is of high
20 interest to DTSC's Safer Consumer Products Program,
21 because of the obvious testing here, that if you remove --
22 if you can reformulate a product, what happens, can you
23 lower exposures?

24 --o0o--

25 DR. PETREAS: Okay. So as usual, I'll give you a

1 few of the other activities, DTSC projects, that are not
2 funded by Biomonitoring California, but indirectly
3 complement the Program.

4 --o0o--

5 DR. PETREAS: So some years ago, we had reported
6 very high PBDE levels in California breast milk. That was
7 from women who participated in 2003 and to '05, way, way
8 in the beginning. Of course, we had found record levels
9 and we published that.

10 In the meantime, there was a legislative
11 intervention and which led to the phase-out of PBDEs. So
12 we thought can we see any effect of that? So we decided
13 to repeat the study in 2010 and '11, and this time
14 recruited 67 women. Similar demographics, used the same
15 protocols, but we only worked with one of the facilities,
16 one clinic in Santa Rosa. So we had more access and more
17 consistent protocols with the staff there, because in
18 addition to the breast milk, we collected cord blood at
19 birth and also maternal blood.

20 So I should say that both studies were partially
21 funded by U.S. EPA Region 9 and we're grateful for that.

22 So what did we find? So if we can compare breast
23 milk between the two periods, this is what we saw.

24 --o0o--

25 DR. PETREAS: So red is the first period, green

1 is a newer period and you can see significant drops. This
2 was just published in Chemosphere.

3 --o0o--

4 DR. PETREAS: So what we saw is there was a 39
5 percent drop in the sum of PBDEs between the two time
6 periods. On the other hand, every breast milk had PBDEs,
7 so babies would be exposed. And, in fact, 30 percent of
8 the babies would be exposed to BDE-47 above the U.S. EPA
9 reference dose.

10 The good news is that in the previous study, 60
11 percent of the babies would exceed that same reference
12 dose. So overall levels are dropping and the fraction of
13 highly exposed babies is dropping, but still we have quite
14 a ways to go.

15 --o0o--

16 DR. PETREAS: Nevertheless, that was of very high
17 interest for our Department. So last week, we had a press
18 event with our Director, Barbara Lee, which she's quoted
19 here stating that, "This study shows that regulatory and
20 public health intervention works. The new findings
21 underscore the importance of biomonitoring studies, and
22 highlight the concrete benefits of product reformulation".
23 That's from the Sacramento Bee article that came the next
24 day. So it's nice to know that Director Lee appreciates
25 biomonitoring studies.

1 --o0o--

2 DR. PETREAS: In addition, very recently, the
3 second study, not only breast milk, but in cats. Again, a
4 similar idea. We had published the paper where we found
5 high levels of PBDE in cats. These are the dark columns.
6 And as you can see, the second time, both times were after
7 the phase-out, but we see a time trend. So whereas, the
8 PCBs and pesticides did not change between the two
9 periods, there was a significant drop of PBDEs, between
10 the two periods.

11 And moreover, when we look at the PBDEs in cats
12 with -- who are hyperthyroid and cats that were not
13 hyperthyroid, the ones which were hyperthyroid had higher
14 levels. So that was an interesting paper, and it's coming
15 out -- actually, it's out in ES&T just this month. So
16 pretty consistent results.

17 --o0o--

18 DR. PETREAS: PBDEs are dropping in California.
19 It's consistent with some other -- with the phase-out of
20 PBDEs from the furniture. And we can support that,
21 because we are involved in the -- in a side project in
22 supporting the Department of Consumer Affairs in enforcing
23 the new labeling law, SB 1019, which every new piece of
24 furniture now will have a label indicating whether it does
25 or does not contain flame retardants.

1 So in preparation for that, we received a lot of
2 these kind of products, we analyzed, and we didn't find
3 any PBDEs. We hardly find bromine in those contemporary
4 furniture pieces. A lot of other things, you know, but
5 that's beyond the point.

6 So furniture doesn't have so much PBDEs now. And
7 our data on dropping PBDEs in the breast milk is
8 consistent with our previous findings. Actually, the
9 first time we reported a drop in human blood was in 2013
10 in collaboration with UCSF.

11 --o0o--

12 DR. PETREAS: And the question is we see that
13 PBDEs are dropping. We're not sure if they will continue
14 to drop or they will reach a plateau, like the PCBs have
15 done.

16 --o0o--

17 DR. PETREAS: Because, if I show you here, this
18 is a collaboration with UCSF. And the first two bars are
19 the data we use for the Zota paper showing 39 percent drop
20 between 2008 and three years later. Now, the third phase,
21 which is exactly the same, second trimester, maternal
22 serum, there's not so much of a drop. So we're not sure
23 if it's something -- is it that the two periods, the
24 second and third period are too close together or
25 something is happening and things don't change that much?

1 So there's more to do and we'll have more
2 information in future presentations, where both Dr. Park
3 and I can both or either of us present additional material
4 here. And with that, I'll leave you.

5 And if you need any information about our
6 seminars, if you want to be on our mailing list, contact
7 me and we'll put you there. We have good webinars. So
8 with that, are there any questions, please?

9 (Applause.)

10 CHAIRPERSON BRADMAN: Thank you for that
11 presentation. It was really fascinating. I think the
12 information on changing levels in PBDEs in humans and in
13 house cats is really just kind of data that really helps
14 us understand, you know, whether policy interventions
15 really work. And I think that's so valuable.

16 So, Tom.

17 PANEL MEMBER MCKONE: Yeah. This is really
18 interesting work, and it's encouraging to see the PBDEs go
19 down. I guess I have a concern that there are substitute
20 flame retardants that were going in during this time, that
21 some of this is just going down because there's --
22 industry was switching before changing was switching to
23 the organophosphates and are we watching those? This is
24 probably a broader question than just for you, but, I
25 mean, are we watching the other flame retardants?

1 DR. PETREAS: Yes, we are.

2 PANEL MEMBER MCKONE: Okay. Great.

3 DR. PETREAS: I mean we're watching not only us,
4 but others as well. We're watching with the products,
5 first of all. So, yes, as PBDEs were dropping Firemaster
6 and other bromo -- brominated flame retardant was coming
7 up, then the TDCPPs, the organophosphates are coming up.

8 So we know what's happening in the consumer
9 products. We know what's happening in dust. There were
10 studies reported where PBDEs are dropping, but of course,
11 these other chemicals appear in dust higher.

12 Now, those classes are not measurable in serum.
13 So PBDEs we can measure in serum, but the OPFRs have to be
14 in urine and some of the Firemaster, mostly in urine. So
15 it's not something we could measure in these type of
16 studies.

17 We know that by the time we did our study,
18 industry had already moved to new chemicals. And the
19 classes we know were measured in the appropriate matrix.
20 But the data pattern tracks, we cannot measure at the same
21 time.

22 CHAIRPERSON BRADMAN: Dr. Luderer.

23 PANEL MEMBER LUDERER: Thank you for that
24 presentation. Very interesting as always. I have a
25 question about the PBDE concentrations and the -- I was

1 noticing that the cat levels seem to be particularly high.
2 And I'm wondering do we think -- do they have an idea
3 whether that's related to their being closer to the ground
4 and more exposure to dust and licking their fur or does it
5 have anything to do with metabolism?

6 DR. PETREAS: Both. So we know that cats cannot
7 metabolize, cannot glucuronidate. So there's something in
8 the metabolism. And of course, they're closer to the
9 ground. They groom themselves. They're good sentinels
10 for little children, of course. But you're right, you
11 observed that -- you have a good eye observing differences
12 in concentrations. I remember the morning.

13 (Laughter.)

14 DR. PETREAS: Yeah, so much higher levels in the
15 cats.

16 CHAIRPERSON BRADMAN: Any other?

17 PANEL MEMBER LUDERER: I want to highlight what
18 you just said, that -- the point that they might be good
19 surrogates or models for children with the, you know,
20 hand-mouth contact, and being on the floor. So that
21 obviously -- maybe -- I don't know whether you have any
22 biomonitoring studies ongoing or samples that could look
23 at these levels in children and see how they're decreasing
24 over time as well. That would also be very interesting.

25 DR. PETREAS: I think we'll talk about some ideas

1 for monitoring children in the future. Yeah, next
2 presentation.

3 CHAIRPERSON BRADMAN: Anymore comments, questions
4 clarifications from the Panel?

5 Okay. I guess thank you, Myrto, very much.

6 I guess we'll then move on to our section of the
7 comment. At this point, we have an opportunity for --
8 well, there's potentially an opportunity for Panel
9 questions, but right now I think we should have -- invite
10 any public comment on what's been presented since we got
11 back from lunch. So if there any submissions, let us
12 know. Are there any submissions from the web?

13 DR. PLUMMER: No.

14 CHAIRPERSON BRADMAN: No public comments?

15 This is a time when we miss Davis Baltz, who
16 was --

17 DR. SINGLA: I have a comment, but I don't have a
18 mic.

19 Thank you. Veena Singla with Natural Resources
20 Defense Council. I wanted to thank Dr. She and Dr.
21 Petreas for those very informative presentations. And I
22 also found the flame retardant results that Dr. Petreas
23 presented very interesting. I was particularly alarmed by
24 the higher PBDE exposures to folks living closer to solid
25 waste disposal sites. I think that highlights the legacy

1 problem that we do have with the PBDEs, because it's
2 estimated that there's still about 70,000 tons of PBDEs in
3 use in products in homes in Canada and the U.S..

4 So there -- it's estimated that there will be
5 ongoing exposures to PBDEs, even though they've been
6 banned and phased out, because of the large stock of
7 in-use products. And I think of the communities near
8 waste and disposal sites, also recycled products that
9 contain PBDEs are definitely a concern for exposures,
10 because the -- as Dr. Petreas pointed out, the levels in
11 breast milk are still a concern, even though they're
12 dropping, and the communities with higher exposures would
13 likely be higher than those levels of concern as well.

14 MS. BUERMAYER: Hi. Nancy Buermeyer with the
15 Breast Cancer Fund. Again, thank you to everyone.

16 I actually had a question and I'm not exactly
17 sure who to ask it of. But in thinking about some of the
18 other flame retardants that are out there beyond PBDEs, I
19 was in some meetings this week where people were talking
20 about challenges in identifying exposures to TBBBP, which
21 we, I think, are all exposed to, but I think it's been
22 difficult to measure in biomonitoring studies.

23 So is that true, and are you all working on
24 developing methods specifically to TBBBP? It's a flame
25 retardant. I'm looking. Yes, I'm sorry. TBBPA. Sorry.

1 That's why I had all these confused looks coming my way.

2 DR. PETREAS: Myrto Petreas, DTSC.

3 Assuming we're talking about tetrabromobisphenol
4 A, TBBPA, that's a chemical that used to be used a lot as
5 a reactive chemical. So it was well bound to plastics, or
6 the television sets and the backing. We're hear -- and so
7 once it's well bound, it doesn't escape, it doesn't
8 migrate so well.

9 Now, we hear that it's been used instead of PBDEs
10 even in foam, in some other material, and it's an
11 additive, so it could escape. So until this information
12 came up, nobody had paid too much attention to TBBPA in
13 humans. And we had measurements in dust and some
14 products, but I think this is one of the things we need to
15 investigate. We have not so far.

16 DR. SHE: Like Myrto mentioned, many of the newer
17 flame retardants may end up or the metabolites in the
18 urine. Instead of like the legacy ones, PBDE, which is
19 persistent, tended to be in blood. I believe TBBPA, if
20 they really go through the metabolism program -- process,
21 that may end up in urine, put them in the non-targeted
22 screening as a first step, maybe one option.

23 CHAIRPERSON BRADMAN: Any comments,
24 clarifications of the Panel? Anymore comments from
25 Program staff.

1 Okay. Well, I just, I guess, wind this up now.
2 But actually I want to thank Veena for your kind of
3 calling out the issue of higher PBDE exposures closer to
4 solid waste facilities. I mean, actually thinking about
5 that, that's a very dramatic finding. And if that holds
6 up, you know, that's actually really important. And 10
7 kilometers is pretty far. So we're talking about
8 potentially a lot of people living close to solid waste
9 facilities, whether it's a transfer station or some sort
10 of disposal.

11 It's hard for me to actually think about the
12 mechanisms by which PBDEs would get out of a facility and
13 into the neighborhood, other than maybe, you know, dust or
14 some -- you know, some other mechanism, or perhaps, you
15 know, fugacity, to finding the pathways where it moves
16 through the environment.

17 But I'm actually -- I hope I can participate in
18 that -- listen to that seminar, but if we can't, I'd be
19 certainly interested to hear more updates about that, and
20 look forward to the article that's coming out in ES&T.

21 PANEL MEMBER BARTELL: A quick question. Were
22 those going to be on-line seminars?

23 DR. PETREAS: Webinars.

24 PANEL MEMBER BARTELL: Webinars. Thank you.

25 CHAIRPERSON BRADMAN: So if there's no more

1 comments then from the

2 DR. PETREAS: Yes. Webinars.

3 PANEL MEMBER BARTELL: Yes, webinars. Okay.

4 Thank you.

5 MS. HOOVER: Yes, it's an on-line webinar.

6 CHAIRPERSON BRADMAN: All right. So I think we
7 can then move on to the next agenda item, which is the --

8 MS. HOOVER: Asa, so no last -- no further Panel
9 input or discussion in general for ECL or EHL, anything
10 about the lab updates, just double checking?

11 CHAIRPERSON BRADMAN: Okay. I kind of hinted at
12 that, but are there anymore general comments for the labs?

13 PANEL MEMBER BARTELL: I just -- I have a
14 question that would be helpful for me as someone who's
15 still relatively new to this Panel. Is there sort of a
16 clear demarcation of responsibilities between these two
17 labs? Because it strikes me that, you know, there's
18 potentially some overlap in the kinds of things you would
19 measure, or do you just decide sort of on a case-by-case
20 basis for these studies which lab is going to handle the
21 analyses?

22 DR. DiBARTOLOMEIS: You haven't heard from me yet
23 today. So this is Michael DiBartolomeis. I wasn't around
24 at the very beginning of this Program, but there is
25 demarcation between the two labs. It kind of splits where

1 persistent chemicals, and those in blood would be in the
2 ECL lab, whereas urinary metabolites, as well as metals
3 would be in EHL.

4 The one major deviation from that is just fairly
5 recently where the flame -- the organophosphate flame
6 retardants is a method that both labs developed for
7 different reasons, but we now have -- that's the only
8 method I know that we're -- where we're overlapping. And
9 this was something that I assume was just decided by
10 the -- early on, because of either previous experience in
11 the laboratories or some decision making that that
12 occurred earlier on in the Program.

13 CHAIRPERSON BRADMAN: Any other Panel comments?

14 I mean, I guess -- sorry, you kind of prompted me
15 to think a little bit more generally. And, you know, one
16 comment I had is that Dr. Petreas also raised concerns
17 about some loss of staff and some funding issues and
18 challenges filling vacancies. And we haven't really
19 talked about the financial status of the Program for a
20 while. You're going to? I was going to say --

21 MS. HOOVER: Good segue.

22 CHAIRPERSON BRADMAN: Well, with that --

23 (Laughter.)

24 CHAIRPERSON BRADMAN: -- I'll introduce Michael
25 DiBartolomeis, who's the Chief of the Exposure Assessment

1 Section in the California Department of Public Health and
2 leads Biomonitoring California.

3 (Thereupon an overhead presentation was
4 presented as follows.)

5 DR. DiBARTOLOMEIS: Thank you, Asa, and hello,
6 everyone. I'm in that enviable position, I think, of
7 being the last speaker of the day. So I'll either command
8 your attention, because you know if I don't finish, you'll
9 never go home.

10 But I am going to do something quite different,
11 not only from today's presentations, but just different in
12 general. I haven't even given something like that -- done
13 something like this before.

14 So let me just kind of reflect a bit, and spend
15 just a minute to reflect a bit. We're all here because we
16 have common goals, common interests, whether it be public
17 health, environmental protection, children's health, the
18 chemistry of chemicals and the toxicity of chemicals,
19 justice, environmental justice. I mean, we have common
20 goals that we all share.

21 But what's different is that each one of us is
22 here through their life path. They got here -- we got
23 here in a different path. We're here for slightly
24 different reasons maybe, choices we made earlier on our
25 lives, so our life and professional experience are quite

1 different.

2 In thinking about this session today and that
3 knowing that we were going to go last -- or I was going to
4 go last, staff have -- the staff urged me to pull away and
5 do something a little different, which would be, since we
6 all have stories to tell about how we got here, Michael,
7 what is your story; how, and more importantly, why are you
8 here; and how does that relate to the direction that the
9 Program is going, since theoretically I'd have some kind
10 influence on that? And based on my past experiences, what
11 do I see that -- where this Program is heading that would
12 address some of the things that I saw as I was growing up
13 and becoming older?

14 So if you can indulge just for a little bit, I'm
15 going to tell you my story. And I hate to say this, but,
16 you know, it was a dark and stormy night -- no.

17 Actually, it does start with me growing up in
18 the -- in a wicked small town outside of Boston with three
19 sisters. And I had no brothers. And early that wasn't --
20 early on that wasn't a problem, because when you're two or
21 three years old, and your older sisters are torturing you,
22 you just have no clue that they're actually torturing you.

23 But as you get a little bit older, you realize I
24 should be doing things apart from that. And I started to
25 explore the world outside of my little sibling situation.

1 And I was lucky enough to grow up and live in a yard that
2 had a beautiful backyard.

3 --o0o--

4 DR. DiBARTOLOMEIS: This is not it. But I did
5 have about an acre of woods in the backyard. And I
6 started going out there on my own and finding my little
7 spots, my sanctuaries where I could escape and hear the
8 bird song, and smell the fresh air, and just enjoy the
9 trees. And this is back in the sixties. And just really
10 became a part of nature.

11 And my mom encouraged me to go to camp and do
12 this sort of thing, and explore the outside world. As I
13 got older, I went outside of the backyard and started
14 exploring the neighborhood, and then eventually the State
15 of Massachusetts, and then the country, and even
16 internationally.

17 But one thing always struck me and bothered me.
18 And it was something that has stuck with me ever since,
19 and that is it didn't matter where I was outside of my
20 yard, wherever I walked, no matter how far away I was from
21 houses and urban sprawl and all that, I found trash, trash
22 on the side of the trail, trash in the river, trash along
23 the seashore. And trash became an obsession of mine. I
24 started literally picking it up and packing it out
25 wherever I was, and had just really become obsessed with

1 trash.

2 And the other thing that was happening in the
3 early seventies, and I know there are some people here old
4 enough to remember this, we started seeing a lot of
5 photographs of polluted air in L.A. and Lake Erie with
6 brown water, even Charles River. So pollution -- the
7 visual pollution was a very -- was very important, and had
8 reached a point where the government started to take
9 action.

10 So there was a very visible world out there that
11 was removing that pristine environment and replacing it
12 with something that humans have treaded on, humans
13 trespassed. And this is going back to my childhood. Why
14 did I see trash, why did it bother me? It's because I
15 thought I was escaping from that sort of world where there
16 was a lot of these external influences, where I wanted to
17 be one with nature.

18 But seeing those cans and beer cans and all that
19 stuff, brought me back to that point where I was saying
20 humans have trespassed on this area.

21 So I got to college, and I was -- I started
22 college with the thought that I was going to be an M.D.,
23 because that's what my father wanted me to do. I wanted
24 to be an architect, but that's another story. So I took
25 the usual classes one takes in pre-med. And by the time I

1 got to my sophomore year, I realized I wasn't going to be
2 an M.D., because I didn't really like organic chemistry
3 and it didn't really like me either, and I was kind of in
4 limbo.

5 And so my first future ex-wife actually handed me
6 a piece of paper. And it was a seminar lecture notice for
7 a lecture on toxicology. And, okay, that sounds good. I
8 don't even know what it is, but it sounds good. Because
9 remember, this is back in 1973 or something like that or
10 '76. And I went to the lecture, and afterwards I had this
11 Eureka moment. I said, I can go and become a
12 toxicologist, go to grad school, you know, get all -- do
13 that sort of thing. And then I can wear a badge that says
14 I am authorized to clean up this stuff. I'm authorized to
15 go out there and clean up the world.

16 So I pursued that path, and got my degree, and
17 eventually ended up in State service. And it was quite
18 different than I thought it was going to be. I thought I
19 really was going to be an environmental pollution police
20 or a cop or something. It turned out that it was -- it's
21 much more theoretical. And up until -- really, when you
22 think about it, a lot of the work we do is very
23 theoretical, chemistry is more -- much more applied, but
24 then again when you're trying to figure out what is safe,
25 what is not safe, you tend to do -- work a lot with the

1 theoretical.

2 And I really hadn't felt completely fulfilled,
3 but I was -- but I felt like at least I was contributing
4 to the basic science around pollution.

5 Well, I would say that around 2012 or so, Michael
6 Lipsett came to me and we started talking about the
7 Biomonitoring Program. And I had been involved in
8 biomonitoring back even when Peter was -- oh, Peter is
9 gone -- but, you know, the discussions early on about
10 setting up a Program in the State.

11 And I realized that we see pollution and we can
12 maybe convince people that the air is polluted or that the
13 water is polluted, but inside of our bodies, that's
14 invisible. That's pollution that's in our bodies that you
15 can't see. And how do you explain to people that your
16 inside is a reflection of what's outside as well. I mean,
17 what goes in is, you know, in a lot of cases, stays in.

18 And I started connecting the dots. Maybe,
19 there's still a chance that I can be that pollution cop
20 and this time expose what's in people's bodies that they
21 can't see, and make them realize that this trash that's in
22 their body needs to be cleaned, and it needs to be -- and
23 we need to stop putting it in there in the first place.

24 So with that, I come to you, and that's why I'm
25 standing here. The reason why I'm here is because I

1 thought I would be able to address those inside our body
2 pollutions with biomonitoring because it is a very
3 powerful tool to expose and divulge what is -- what are in
4 -- what's in our bodies.

5 So how does that relate then to the Biomonitoring
6 Program? What do we -- what are we going to do and how
7 have we been doing, and what are we going to do into the
8 future 2016 and beyond to address some of these issues of
9 the trash that's inside of our bodies?

10 Well, I'm going to talk about that.

11 --o0o--

12 DR. DiBARTOLOMEIS: So you've seen something like
13 this before from me. I've done it in different
14 iterations, and this is evolving. And it's fair that it
15 does evolve, because as we hear from the SGP and from the
16 public, and as we do our own research, we're going to want
17 to advance different ideas as we move forward.

18 So none of this is totally brand new. Although,
19 some of the concepts that we're pushing now are a little
20 bit newer.

21 So in terms of the general mandate, of course, we
22 have the statewide surveillance. And let me break this
23 out, so we can --

24 --o0o--

25 DR. DiBARTOLOMEIS: So it is our primary -- one

1 of our primary mandates. And you know all too well about
2 the BEST study, the Central Valley study. That's more or
3 less looking at a randomized population with Kaiser
4 Permanente. And the MAMAS samples which you've heard
5 about from the labs earlier, that's also mentioned to get
6 at more of the statewide surveillance. We're not
7 satisfied. And for obvious reasons, this is not going to
8 get us at the bigger question of what's trending in the
9 State and what would be a background level, et cetera, in
10 the State.

11 But you also know of our funding issue. So we're
12 not able to do the type of study that one might want to do
13 if they were to design it like an NHANES, or something
14 along those lines, but we do think we have other ideas for
15 collecting specimens by doing more mobilized collections,
16 rather than having them be archived. And amongst that,
17 that might involve bringing children in to biomonitor.

18 I'm going to speak a little bit more about
19 children in a second. And with these kind of samplings,
20 we can actually nest other types of studies in, so whether
21 it be an intervention or a consumer product type of
22 emphasis. And we can also couple our statewide
23 surveillance with environmental monitoring. This might be
24 important, for example, if we were asked to look at a
25 community that might have high lead exposures, or

1 something along those lines, where you can do water
2 monitoring and biomonitoring.

3 So this is really not a new thing, but it
4 definitely fits in with the context of looking inside of
5 our bodies and being chemical detectives to see what is
6 in -- what is in Californians bodies.

7 --o0o--

8 DR. DiBARTOLOMEIS: We've talked about consumer
9 products in the past. It's a very important collaboration
10 with the Department of Toxic Substances Control that we
11 work together to look at what kinds of products might be
12 contributing to the invisible pollution in our bodies.
13 And obviously, there would be an opportunity then to set
14 policies and do regulatory action to take action to
15 actually change what might be a formulation in a product.

16 The FREES study, which we've already heard about
17 today, this afternoon, is one of those such studies. It's
18 really a pilot. It's not a large study, but we're
19 actively pursuing it. We're hoping that in a year from
20 now somebody will be able to stand here and give some, you
21 know, preliminary results, for example, to see what might
22 be happening. But basically, that's, you know, an
23 important priority that will help us get at some of the
24 things that are really important for us.

25 --o0o--

1 DR. DiBARTOLOMEIS: We've talked about
2 interventions. We've heard, let's see about a year ago or
3 so. I can't remember when Kim Harley was here. But when
4 we heard about the HERMOSA study, that's like a
5 prototypical intervention study perfect for biomonitoring.
6 It's small enough that you can do it with a reasonable --
7 within a reasonable time frame, with reasonable resources.
8 That involved community, so you're having -- you're
9 actively educating as well as involving community.

10 And on top of it all, there's a quick policy
11 result there. Wow, you take these chemicals away and
12 these products, and you'll see a reduction in these
13 invisible chemicals, and therefore there's an immediate
14 action that can be taken.

15 --o0o--

16 DR. DiBARTOLOMEIS: Those of you who know me know
17 that I come from a -- also a background of environmental
18 justice work, back -- all the way back into the early
19 1990s. And this is a really important aspect of our work
20 in biomonitoring as well, because not only are we
21 interested in how populations and communities might be
22 disproportionately burdened by external chemicals or
23 chemicals from the environment or consumer products, but
24 it's also important again to involve communities in these
25 studies, to get them to understand what they can do, what

1 kinds of -- by learning about these things how much power
2 they would have to -- and how much their voice becomes
3 louder in the forum of politics.

4 We do have one study underway, which is the
5 Asian -- let's see the ACE study. I don't know if we've
6 actually mentioned this yet, or if it's come up really
7 briefly, but it's the Asian and Pacific Islander Community
8 Exposure Project. We are pretty much still in the early
9 stages. We're still in the IRB stages and in developing
10 some recruiting protocols, et cetera. But we -- this will
11 be well underway. And this is an EJ context project where
12 we're looking at Asian populations where they -- for
13 certain chemicals, mainly metals, and I think it's
14 perfluorinated chemicals.

15 Thank you.

16 And these -- and partially with the survey
17 instrument we'll be using, we'll be looking at diet and
18 exposures that might be specific to this community.

19 And, of course, we've also talked about how we
20 would use existing databases, such as -- and approaches
21 such as CalEnviroScreen and Environmental Health Tracking.
22 So EJ and biomonitoring really go together like peanut
23 butter and jelly, so I think we're going to be seeing a
24 lot more moving forward with EJ emphasis, and
25 incorporating this concept into our planning.

1 --o0o--

2 DR. DiBARTOLOMEIS: Finally, as promised,
3 we're -- this is something new. We have always talked
4 about children and how important children are in
5 developing children, and to be able to track chemical
6 exposures early on in a person's life. And we haven't
7 really partaken in these types of studies as a
8 biomonitoring program. And a little bit -- partly, it
9 might be because of having to rethink a little bit about
10 collection of samples and those sort of things, partly
11 because maybe the recruitment aspect is a little bit more
12 difficult.

13 But we do think that, at this stage, we should be
14 at least piloting such a study. And I think this is going
15 to be further -- there will be further discussion as this
16 year rolls on. And I think we already have some interest
17 on the Panel for pursuing this. I look at Dr. Bradman,
18 for example, because we've heard that before.

19 --o0o--

20 DR. DiBARTOLOMEIS: And then finally, as we've
21 heard from the laboratories today, it's not just
22 continuing with a routine analyses of chemicals, we have
23 to keep expanding our methods. We have to keep advancing
24 them. It's really important that we stay ahead. As
25 chemical products change in their formulations, as the

1 ratio of chemicals change in the environment, we have to
2 be ready and willing, if we're going to continue to be
3 detectives, to explore new methods, to look for new
4 chemicals in our bodies.

5 And we talked about targeted and screening
6 unknown chemicals, but we also have panels that can be
7 expanded, phthalates, for example. There are other
8 phthalates that we don't have in our panels. And we can
9 also create new panels as needed. But obviously, as you
10 will see in the last part of my presentation, we do have
11 some challenges.

12 --o0o--

13 DR. DiBARTOLOMEIS: Well, you asked me for an
14 update on funding. So I just happen to have an update on
15 funding. First of all, our current budget still is -- we
16 still have a very -- a steady level of State funding.
17 We -- and I want to correct one thing that Dr. She had
18 mentioned earlier. I don't know if anybody caught it, but
19 he said that we received a cut in CDC funding. I want to
20 clarify, just so you all -- I think you all know what I'm
21 going to say, but we actually had a five-year grant. At
22 the end of the five-year grant, which was August of 2014,
23 we were awarded a new grant from CDC for five years, but
24 the maximum award level was significantly less than the
25 original maximum award level.

1 Even though we received the maximum award level,
2 it's significantly less. And I think that's what Jianwen
3 was referring to took when he said we took a cut. But
4 technically it wasn't a cut. It's -- but it is a
5 reduction.

6 The State has been trying to figure out ways to
7 compensate for that, but we're still -- it's a constant
8 sort of annual struggle to even compensate just for the
9 federal fund reduction. And it doesn't really speak to
10 the fact that the funding for the Program has never been
11 optimal in the first place. So I think that answers
12 maybe, Scott, where you were -- I think you had a couple
13 questions about that.

14 And we have created an optimal budget plan for
15 the Program. It's off the shelf and ready to go if
16 anybody wants to actually start thinking about ways to get
17 money into the Program, but we do know what it would cost
18 to have an optimal program, and what the components would
19 be. I'm not prepared to give that presentation today, but
20 you never know, maybe it will come up in the future.

21 Staffing. Again, you've heard a little bit about
22 the staffing problems and challenges from the
23 laboratories. They are real. Part of it is that when you
24 have temporary positions at lower salaries, it's difficult
25 to recruit. We still amazingly draw really good people to

1 the Program, and we are able to maintain some really good
2 people here, but it's difficult to recruit, especially if,
3 you know, as I said, they're temporary positions, and then
4 retaining them. Retaining them if they are finding that
5 they can't live in the Bay Area, for example, on the
6 salaries they are, they're more apt to find a competing
7 salary somewhere else that they're going to jump to, or
8 because the positions have temporary nature to them.
9 They're -- something -- a new opportunity comes up that's
10 permanent, they're going to be leaving.

11 So retaining -- and promotional opportunities are
12 really hard to come by too. So just retaining staff makes
13 it really difficult as well. I'm not complaining. These
14 are just challenges. And we have overcome them, but
15 there -- it's at a cost. Sometimes we're not moving as
16 fast, sometimes we're not able to develop those advanced
17 biomonitoring methods as quickly as one would like or to
18 be able to go into areas which would make a lot of sense.

19 Collaboration. It's a challenge. It's one of
20 those things that -- it's a happy thing to have as a
21 challenge, because anytime you do have a successful
22 collaboration, it's not one plus one equals two. It's
23 like one plus one equals five. I mean, you really do have
24 a synergistic and exponential kind of growth, when you
25 have a good collaboration.

1 But some of the issues with collaboration are,
2 for us, for example, we were not able to fund a
3 collaboration per se, so we would need to have partners
4 that come with their own funding or were able to bring
5 funding into the Program, and, you know, wow, I'm sure
6 we're the only ones looking for that kind of thing.

7 You know, so fiscal partners are always -- we're
8 always on the look-out for fiscal partners. Although, you
9 know, we sometimes have limitations being a government
10 agencies.

11 And then ultimately, to get back to the
12 environmental justice focus, having a community focus
13 means that you need to nurture relationships. You don't
14 just go into a community the day before you want to do a
15 biomonitoring study and expect people to show up. I mean,
16 it really takes a long time. That ACE study I was talking
17 about has been a nurtured relationship for many, many
18 years with some of the advocacy groups in the San
19 Francisco Bay Area.

20 Communication. With any scientific endeavor,
21 communication is always a challenge. It's not essentially
22 a worse challenge for the Biomonitoring Program, but we do
23 have some complicated things that we're trying to distill
24 down into not only audiences that may not have a
25 scientific focus, but audiences that have different

1 cultural and other values, different -- they're coming
2 from different backgrounds. We have, you know, just a
3 vast number of audiences that we have to be able to
4 communicate with.

5 We do some of that well. I think we can do some
6 of it better. Again, some of it's resources, some of it's
7 just -- it just takes some time to develop a capacity to
8 communicate better.

9 Part of this is also that we have -- we have a
10 website to maintain. We have the results return, which is
11 whole other aspect which we've talked about it at the last
12 November meeting. I'm not bringing this up again. But
13 again, these are challenges to keep those things up and
14 going and being of value and meaning -- and still be
15 meaningful.

16 And finally, what I tried to do today was do
17 something a little different, which is we had to be able
18 to translate our -- what we do into story telling, because
19 that's probably the primary thing that people relate to at
20 any level. If you have a story to tell, they're more apt
21 to listen, then if you are going in and just throwing a
22 bunch of data at them. And we just wanted to try
23 something a little different just to see if -- you know,
24 what did it sound like to tell a story to get people
25 interested in biomonitoring?

1 And finally, translating our results into action.
2 Some of this is out of our control, but there is certainly
3 still plenty within our control. For example, there is
4 no -- there is no doubt that what happened with the
5 history of lead in gasoline is a great story of how
6 biomonitoring has changed policy and turned results into
7 action.

8 Unfortunately, we're still dealing with lead in
9 the environment, but at least, you know, we're able -- we
10 understand that formula.

11 I think flame retardants is the more modern
12 example of that. And you've certainly heard a lot about
13 that today. That story is still unfolding. Obviously, as
14 certain flame retardants go down, others go up. And does
15 that mean that we continue -- if we continue to have
16 policies where flame retardants are required, this is not
17 going to go away any time soon, but yet there -- we have
18 seen action. We have seen legislative action. We have
19 seen political action. And that's part of translating the
20 results.

21 So ultimately, the data need to be relevant, they
22 need to be compelling, and they need to be understandable
23 in order for action to be taken. And I think that's a
24 challenge for us as Program and, you know, you, as the
25 SGP, to provide guidance in that aspect, because we really

1 want to be able to not just produce results, but have them
2 actually be translated into something that ultimately will
3 result in a cleaner -- cleaning up the trash, so to speak,
4 inside of us.

5 --o0o--

6 DR. DiBARTOLOMEIS: So I stand here before you
7 today still that little kid that wants to have a pristine
8 river and, you know, a trash-free hike whenever I go out
9 there. And I now know that it's not just what you see out
10 there in the environment, it's what's also in our bodies.

11 So I am committed to that aspect as well. And so
12 that same polluted stream that inspired me as a kid has
13 now gotten me here today to try to inspire everybody in
14 this room to think the same way, that we really have
15 pollutants coursing through our body, just like you would
16 see them in a stream, you know, if you were able to. And
17 that deserves to be divulged and cleaned up.

18 And biomonitoring is that tool that I think does
19 get you at that direct exposure. That's the magnifying
20 glass that we need as detectives. The last time I stood
21 up here, which was in November, I pondered when do I get
22 my name up on the acknowledgement staff. And I realized,
23 well, maybe my name doesn't go there, but certainly maybe
24 my image.

25 So in honor of Dr. Seuss's birthday, which is a

1 couple of days ago, I think, I just wanted to remind you
2 that I'm now in the corner kind of overseeing the forest.
3 So thank you very much.

4 (Applause.)

5 CHAIRPERSON BRADMAN: Thank you, Dr.
6 DiBartolomeis. You know, I think you raise a lot of
7 important issues. And it seems like it's been awhile
8 since we've actually discussed, you know, Program goals
9 and the original legislation and where we are meeting
10 those requirements, and, you know, where and how to go
11 forward.

12 I would expect that there's many people on the
13 Panel who might want to make comments. So is there anyone
14 who wants to respond now? Just to outline the next bit.
15 We have about 10 minutes or so for questions, and then
16 another time for public comment, and then time for more
17 discussion.

18 Dr. Quintana.

19 PANEL MEMBER QUINTANA: Hi. Thank you for that
20 story. It was a nice story. I was thinking about what
21 makes California unique, as we discussed some other times,
22 because our Program really isn't just a smaller NHANES.
23 It's focused on California and the concerns of
24 Californians and the exposures of Californians.

25 And so I was interested in your Asian Pacific

1 Islander study, because that is a major population in
2 California, and may have some cultural exposures.

3 But I'm just curious if you have any comments
4 about other populations. Coming from San Diego, we have a
5 very large immigrant community, you know, I think it's the
6 second largest Chaldean community from Iraq, and all kinds
7 of different populations that I'm curious if you have any
8 comments about what makes California different or any
9 approaches to that issue?

10 DR. DiBARTOLOMEIS: Well, I think we could spend
11 a lot of time just listing what makes California so
12 different. And I don't think that anybody would believe
13 that if we did a CalHANES, that it would look anything
14 like the NHANES.

15 We do have a large populated State with such
16 diversity that I think is unrivaled. And we not -- on top
17 of that, we have -- our geological makeup is quite a bit
18 different. I mean, every state has some part of
19 California, but California seems to have a lot of them --
20 a lot of those things.

21 So just the fact that we're so big and so diverse
22 makes the challenges much more difficult. But I think in
23 terms of approaching, there are many different ways you
24 can do this. You can approach it based on, let's say, a
25 chemical of concern. Let's just use pesticides for an

1 example.

2 If you wanted to look at a community that might
3 be higher -- more exposed to pesticide issues, you go to
4 where the pesticides are used and then you nurture that
5 community and you do some kind of a study there, and we
6 have examples of how that's been done.

7 The issue in the San Francisco Bay Area and other
8 places where fishing is sometimes used for not just
9 sporting, but for subsistence, you start getting into,
10 well, higher levels of chemicals will be going into their
11 bodies because of the contaminated fish. So that's maybe
12 more of a cultural reason to go in and look. You know,
13 the chemicals are of concern. You know the communities
14 there, but are we -- is it because this group is different
15 because they're actually fishing for living, not just
16 fishing for fun or something along those lines.

17 You might be approached by a community. We think
18 we are more greatly -- higher impact because we live by
19 these facilities that are spewing these things out or
20 there's a waste site near by. That's another way that we
21 might get involved.

22 Now, each State has their own pockets of that,
23 but we haven't really -- we haven't really done anything
24 in those -- along those lines as a Program. They're very
25 resource intensive. I mean, you probably can appreciate

1 that. I mean, if we're approached by a community to say
2 we live near these sites and we'd like you to biomonitor
3 us and tell us what's in our bodies, our first thought is,
4 yeah, that would be great, but, you know, where would
5 we -- how would we even start?

6 So there's all these different approaches for
7 bringing in that context making -- and then looking at
8 California specific problems. And then I guess the other
9 thing is that we do tend to push legislation and laws for
10 the rest of the country, whether it's air or water or
11 whatever.

12 And so following and tracking the efficacy of
13 those -- of that legislation is another aspect that would
14 make California unique in terms of biomonitoring. The
15 flame retardant standard is just a good example of that.
16 I don't know if I -- did I give you -- did I respond?

17 PANEL MEMBER QUINTANA: I was just interested in
18 your thoughts from a Program perspective. So thank you.

19 DR. DiBARTOLOMEIS: Yeah, and we're -- you know,
20 we have a continuing discussion about these things like on
21 our -- we have meetings every two weeks, and we're always
22 thinking about ways to draw in more -- a larger, you know,
23 population randomness or something that would allow us to
24 get at some of the -- answer some of these questions.
25 Unfortunately, it always turns then back to what do we

1 give up?

2 DR. FENSTER: I just want make a very small
3 addendum to Michael's answer, which is for the MIEEP
4 study, I just wanted to mention that that study of
5 pregnant women and infants did recruit primarily
6 immigrants, Latina immigrants, and so -- and also for the
7 BEST Study, for the Expanded BEST, we've made an effort to
8 oversample for Hispanics, both Spanish and English
9 speaking, and also APIs.

10 So we will within -- as Michael said, we will be
11 able to within the different studies start looking at some
12 of the issues that you asked about, in terms of cultural
13 practices, immigration, different chemical patterns that
14 we see in different populations and try and understand
15 routes of exposure better through that.

16 DR. DiBARTOLOMEIS: That was Laura Fenster.

17 CHAIRPERSON BRADMAN: So I wanted to follow up on
18 a couple things. One, definitely reiterate -- I feel less
19 articulate today because of this cold. But I want to
20 reiterate your mention of biomonitoring in children.
21 That's kind of something I've mentioned many times over
22 the years. And just because, you know, of course,
23 children are some of the most vulnerable parts of our
24 population in terms of both exposure and health impacts
25 and, I think, the more information we can get on that the

1 better.

2 You know, the funding, you know, that's a much
3 bigger discussion that we didn't go into the details
4 today. But, you know, I think we have been, you know, a
5 little bit successful with partnered grants like HERMOSA,
6 where, you know, a group obtained research funding, but
7 then collaborated with Biomonitoring California on the
8 laboratory components, and also, you know, authorship and
9 really substantive input about what the product of that
10 research is.

11 And maybe that's something we need to encourage
12 more. You know, I know in our group I pressure everyone
13 to go through Biomonitoring California when we write
14 grants. We're not doing much biomonitoring right now.
15 But, you know, maybe that is a role that the lab can play
16 perhaps maybe a little more aggressively in terms of
17 additional partnerships, laboratory collaborations with
18 other researchers, and involvement in grants. Now, we've
19 talked about that in the past. But maybe we're at a point
20 where we should reach out a little bit more strongly,
21 especially with the reductions in CDC support.

22 DR. DiBARTOLOMEIS: Right. I mean, I would agree
23 with you. I think that when I showed you the challenges,
24 I think there all nested -- they're all linked because
25 part -- for example, when you are -- even if you're just

1 trying to couple up with another partner, you have to be
2 able to communicate. You know, what is it that we can
3 offer?

4 It's one thing if you decide we just need to have
5 40 samples analyzed. So the labs might be available to do
6 that. But if you're talking about actually study design
7 and having it dovetail with the other types of things that
8 we want to do, it would be nice to start from the
9 beginning, and, you know, go after research proposals and
10 that sort of thing. We've done that, and it is -- that's
11 time intensive.

12 And I know we can continue doing that, but I
13 don't know if they're going to be -- what my vision is is
14 that we do a lot more of those short, you know, fast
15 hitting HERMOSA types of things, where we're able to
16 produce results. Have results from start to finish in a
17 year where we actually then can go to the policymakers and
18 say, look, here's the story, here's what happened, here's
19 maybe some suggestions on what to do versus a five-year
20 study, where it might -- you know, by the time you're
21 done, maybe the people that were originally interested
22 have left the legislature or whatever.

23 CHAIRPERSON BRADMAN: A little more discussion?

24 Dr. Kavanaugh.

25 PANEL MEMBER KAVANAUGH-LYNCH: I just want to

1 say, so one of the ways that California is also very
2 unique is in investing State resources in research
3 programs. And as the director of the California Breast
4 Cancer Research Program, we have prioritized looking at
5 the role of chemicals in breast cancer. And we would not
6 be able to support the research that we've been able to
7 support in that arena without the Biomonitoring Program.

8 It's been very mutually beneficial, and we've had
9 many projects now that have used the Biomonitoring
10 Program. And without its existence and its ability to
11 respond to some of those scientific questions, we wouldn't
12 be able to fund that research and be exploring that issue
13 and having the success that we're having.

14 We have had -- we have some current RFPs out and
15 just closed one actually looking at asking researchers to
16 look at the role of different ways of affecting chemicals
17 policy and evaluating their effectiveness, such as
18 market-based campaigns, regulation, that sort of thing.
19 We have one out now for biomarkers, which could absolutely
20 include -- and biomarkers of exposure. So definitely very
21 pertinent to biomonitoring as well as another RFP out on
22 risk assessment. And so I encourage anybody who's
23 interested in those to pay attention.

24 CHAIRPERSON BRADMAN: Anymore comments? Maybe I
25 think we now have some time for public comment and maybe

1 it will also spark more discussion.

2 So thank you, Michael.

3 CHAIRPERSON BRADMAN: Are there any?

4 DR. SINGLA: Hello, it's me again. Veena Singla
5 with the Natural Resources Defense Council. In regards to
6 the budget for the Program, I wanted to mention that I was
7 earlier this morning actually -- you might have seen me
8 slipping in and out of the meeting here -- I was
9 commenting at a Senate budget subcommittee hearing
10 specifically on the budget for the Biomonitoring Program,
11 and speaking to the legislature about the importance of
12 the Program for Californian's health and tracking
13 exposures and understanding what's in our environment and
14 in our bodies.

15 And I would certainly encourage the Panel to
16 weigh-in on this issue as well in terms of the importance
17 of the Program with the administration in whatever way may
18 be appropriate.

19 CHAIRPERSON BRADMAN: Is there anymore public
20 comment?

21 Have there been any email submissions?

22 DR. PLUMMER: No.

23 CHAIRPERSON BRADMAN: Okay. Sara, it looks like
24 you want to say something.

25 MS. HOOVER: Yeah. Sara Hoover, OEHHA. I would

1 just suggest that we page through some of Michael's
2 slides, and you can -- as a way to structure your
3 discussion, you can go through the different priorities
4 that we've named. These are priorities we've presented to
5 you previously and Michael is reiterating some of our --
6 you know, what we're focusing on.

7 So I think you could just page through and let
8 Panel members think about this and comment on anything. I
9 think, in general, and I actually used these same
10 priorities to structure the talk I gave in November about
11 topics for this year. But just like you said, it's an
12 opportunity to again have the Panel weigh in on priorities
13 and make any notes or comments about things we should
14 think about as we move forward.

15 CHAIRPERSON BRADMAN: Thank you. I was going to
16 suggest something similar. But just to clarify though,
17 you're not looking for, you know, concrete recommendations
18 or, you know, direction, rather you're looking for kind of
19 comment and agreement, I guess.

20 MS. HOOVER: Well, I mean, you know, basically,
21 the Panel is always providing input and direction to the
22 Program. We have not posed a formal question to the
23 Panel. There's no voting, you know, that sort of thing.

24 CHAIRPERSON BRADMAN: Yeah, exactly.

25 MS. HOOVER: So no formal recommendations, but

1 always input is welcome.

2 CHAIRPERSON BRADMAN: We're particularly quiet
3 today.

4 (Laughter.)

5 CHAIRPERSON BRADMAN: Maybe we should go down and
6 everyone has to say something, but -- Dr. Quintana, we'll
7 start with you.

8 PANEL MEMBER QUINTANA: I'm not quiet. I guess I
9 have a clarification question about the biomonitoring of
10 children. Do you widen that definition to include the
11 pregnant women or in utero exposures?

12 DR. DiBARTOLOMEIS: This is Michael. We haven't
13 actually gotten into the specifics of age groups or
14 anything. I think what we were beginning to formulate in
15 our minds is how would we biomonitor children that are
16 already born into this world. At the age groups that
17 would be, you know, before they reach 16 or something
18 along those lines. I mean, we do know that they're
19 biomonitored for lead as part of the program, but -- I
20 mean, not our program, but as part of the, you know, lead
21 prevention. But, you know, to expand that, and we've
22 heard presentations before in front of the Panel about I
23 think from CDC and EPA about collecting specimens from
24 children. And we just think since that is the most
25 vulnerable of the populations more than likely for

1 chemicals certainly early on in exposure, we wanted to
2 begin to go down that track.

3 The in utero exposures we've done pregnant --
4 we've looked at pregnant women. We're looking -- MAMAS
5 samples are from pregnant. And so you could make the
6 leap, I guess, of faith that what's in the serum of the
7 mother could be also in the serum of the developing
8 infant. But I don't know if we've -- you know, I don't
9 know if we've excluded or included looking at that in more
10 depth as to how we could expand on that population, if
11 that's what you were kind of after.

12 If you're suggesting that we do go down that
13 path, we can certainly -- it doesn't hurt to go down and
14 see what kind of work has been done in the past that we
15 might be able to do. But I think originally we were
16 talking with biomonitoring, you know, like maybe from two
17 to 16 years old or something in that age group, or maybe
18 younger, I don't know.

19 CHAIRPERSON BRADMAN: Dr. Luderer.

20 PANEL MEMBER LUDERER: Just I think following up
21 on that, I mean, I think -- I mean, to me, I think of this
22 as, you know, we're at the stages of development and kind
23 of life course idea. And so I think if you're, you know,
24 going to be biomonitoring children, and you have been
25 doing these wonderful collaborations with the MIEEP

1 program and the current MAMAS program to really try to,
2 you know, not exclude that very early part of development,
3 you know, prior to early childhood that you're talking
4 about, and really including it and viewing it as a
5 continuum.

6 DR. DiBARTOLOMEIS: As you were talking, I was
7 envisioning like an optimal study that might be a
8 proactive -- I mean, prospective study where you actually
9 begin with a population of pregnant women, and then you --
10 and then as the children are born, you follow them for the
11 first two or three years of their life or something, it
12 sounds great.

13 Certainly, we can develop a theoretical project
14 like that. Maybe it is worth pursuing and finding
15 partners to doing something like that.

16 CHAIRPERSON BRADMAN: Dr. Quintana.

17 PANEL MEMBER QUINTANA: A follow up on the follow
18 up. You know, that study does exist in a pilot stage, and
19 that's the National Children's Study, and it had several
20 sites in California. And I don't think those samples have
21 been fully exploited, and that I was just curious about a
22 formal collaboration with those archived samples.

23 DR. DiBARTOLOMEIS: Well, I think you might have
24 known that we applied for the initial -- with UC Berkeley,
25 we applied for one of the grants that would have set up a

1 center in the west coast to do the biomonitoring of all
2 those samples and the ones that are going to be collected.
3 We weren't successful. That doesn't mean that there
4 wouldn't be still some opportunity possibly to hook up
5 with the existing centers to do some of that work.

6 There is actually a new proposal -- a RFA out, I
7 think. Are you familiar? It's the sort of second part of
8 that, which is to look for cohorts. And we're exploring
9 that also, partly as our Branch in CDPH, but it would
10 involve some biomonitoring component more than likely.

11 PANEL MEMBER QUINTANA: I was thinking
12 specifically of the archived samples from the Vanguard
13 Centers.

14 DR. DiBARTOLOMEIS: Yeah, I -- that I don't even
15 know. That's something I know something about, but I
16 don't know how easy it would be to be able to access.

17 PANEL MEMBER LUDERER: There was just a notice
18 that came out this week that the archive is now actually
19 up and running. And so I'm sure -- I mean, I or somebody
20 else or one of the other members, could forward that
21 information to you, because I think that would really be
22 worth pursuing as a program.

23 DR. DiBARTOLOMEIS: Yes, please do. That's new
24 to me.

25 CHAIRPERSON BRADMAN: That notification literally

1 came out just in the last few days.

2 DR. DiBARTOLOMEIS: I should have been on top of
3 it.

4 (Laughter.)

5 CHAIRPERSON BRADMAN: Dr. McKone.

6 PANEL MEMBER MCKONE: Well, I just want -- I
7 mean, I do want to follow on that.

8 CHAIRPERSON BRADMAN: That's okay.

9 PANEL MEMBER MCKONE: I'm looking at the
10 priorities. So I guess one of the questions is do you
11 believe you can pursue all of these equally or are you
12 looking for some feedback about -- the interesting thing
13 about -- I mean, for me, looking at these, they're all
14 really important, right, so it's hard to say, oh, this
15 one.

16 MS. HOOVER: Dr. McKone, your microphone.

17 PANEL MEMBER MCKONE: Microphone, right up next.
18 Okay.

19 (Laughter.)

20 PANEL MEMBER MCKONE: You know, they're all
21 important. I don't know if there's ways to set priorities
22 based on, you know, near term what's going to provide a
23 lot of return. I look at it and go like, well, you can't
24 throw out advanced biomonitoring science, because that's
25 kind of like throwing out your seed corn or whatever. I

1 mean, you don't have anything to grow into. You just do
2 it.

3 Good children we all admit is pretty important.
4 Environment -- I think actually environmental justice and
5 statewide surveillance might -- I mean, that could be the
6 goal is statewide surveillance, so they might be merged a
7 bit.

8 Interventions, that's a bit broad. I think, you
9 know, like chemicals in consumer products is ripe for
10 intervention, and we're already doing some of that. And
11 that one might be really useful, because of its strong
12 tie-in to a really important effort and DTSC to try and
13 understand not only what's there, but how to get -- how to
14 find alternatives and make sure those alternatives aren't
15 going to be just as bad or different bad than what we have
16 now.

17 So, I guess, I'm -- the question is there are
18 some ways probably to set priorities. I don't know if
19 you're looking for a little more detail or if you've
20 already done this internally and have some way of ranking
21 these?

22 DR. DiBARTOLOMEIS: Well, We're going to -- we're
23 kind of thinking out loud here, right?

24 Yes, we have -- these priorities are evolving,
25 and we have actually spent some time -- if you look at the

1 slide history since I've been here, they've been slightly
2 different each time, not a lot, but biomonitoring children
3 is the first time it's appeared on any of my slides. So
4 other than if you take children out of there, we're
5 working on all the other priorities in some capacity,
6 manner, or form. And children you might argue that, well,
7 we've looked at prenatal and, you know, infancy, you know,
8 biomonitoring -- you know, we've done some work in that
9 area.

10 So if you were to just kind of look at these on
11 face value, the Program is, in some capacity, working on
12 all of these priorities. The beauty of many of these is
13 they can be nested and intertwined. There isn't any
14 reason why you just follow down a path of an intervention,
15 for example, and not necessarily think that you might
16 include children, a consumer product, and an EJ community.
17 I mean, you can factor all those types of things in and
18 develop a study design that will have a lot of these
19 elements in it.

20 But the truth is, as you did already point out,
21 that you can't do everything as well all the time. You
22 know, you have to make some choices. And so we have been
23 making choices early in the Program. Before I came on
24 board, there were choices to try to find surrogates for
25 statewide surveillance or to look at targeted populations.

1 There was less interest or less movement at that
2 point on doing consumer products or interventions and
3 those sort of things. We're moving in that direction,
4 partly because of DTSC, partly because of the -- of our
5 emerging interests. So this is not stagnant. I think
6 that every -- at every SGP meeting if there's a discussion
7 about priority setting, and whatever might be -- we heard
8 this morning about diesel biomarkers again. So there
9 might be -- that might be on people's -- high on their
10 list again.

11 So there isn't any reason why we can't continue
12 to talk about this. But keep in mind that, you know, as
13 we begin studies, they have to finish, and then you have
14 to be juggling, and laboratories have only a certain
15 amount of capacity in terms of equipment and staffing and
16 all this sort of thing. So we don't want to get too far
17 ahead of ourselves.

18 So as I'm thinking out loud, I value anything
19 that comes -- and I know we all do value anything that
20 would come from the expert panel on, you know, how we
21 might try to prioritize and what is an emerging issue that
22 has real prominence because of the timing or the times
23 we're living in.

24 We didn't even put climate change up here for
25 example. But if there are some things that would be

1 chemical uses that would be changing as the climate
2 changes, you know, is that something we want to pursue?

3 So I -- that's all I'm going to say. I can't
4 commit to one thing or another. But you have actually hit
5 on probably one of the hardest jobs that I have in terms
6 of thinking about the Program is how to identify these
7 things, but also keep the lid on, so that we don't get too
8 far ahead and spread too thin.

9 PANEL MEMBER BARTELL: Yeah. I'm going to throw
10 out an idea here, and see what the reaction is. I look at
11 this list, and I just -- I don't see the feasibility of
12 statewide surveillance in the next couple of years, given
13 the budget issues you've talked about. You would know
14 better than I. But, you know, I understand that, you
15 know, doing a representative sample like it's done in
16 NHANES is an extremely expensive endeavor.

17 And even if it's not, you know, a complete
18 database, still to actually take the time to do that
19 population based multi-level sampling to try to get
20 representation from say, for us, would be all the counties
21 in California, and make sure we hit all the racial
22 subgroups, and socioeconomic subgroups that we want to
23 hit, I just -- I think -- and you again may have run some
24 of these numbers, since you've been thinking about ideal
25 designs, but I think that's probably like orders of

1 magnitude more expensive than you probably have the budget
2 for or at least have had in the past few years.

3 And while I know that was sort of the original
4 intent of the legislation, and may be great goal for some
5 day getting to, I guess I just wonder if it's realistic in
6 the next couple years, given what the budget is now, to
7 even have that on the priority list.

8 DR. DiBARTOLOMEIS: Well, a couple of answers to
9 that. One is it has to be on our priority list, because
10 it's such an important mandate. It would be just not the
11 correct thing to do to present something that is written
12 into statute and says you shall do this. We have come up
13 with ways to address the issue in a smaller targeted or,
14 you know, population, or as a smaller populations were in
15 different parts of the State.

16 In our optimal planning, our optimal Program
17 design, the actual funding to do something that isn't
18 quite the NHANES thing, but it's certainly better than
19 what we're doing now is not totally prohibitive.
20 Certainly with our current budget it is, but if you -- if
21 we were to -- I mean, we haven't -- we have an exact
22 budget that we could put forward, that puts us into, you
23 know, probably two or three times more funds than we
24 currently have or something along those lines. So it's
25 not like we're talking so much money that forget it.

1 So it's tricky. It's a tricky thing. And again,
2 we can couple some of our statewide surveillance ideas
3 with children biomonitoring or, you know, you could even
4 nest a consumer product exposure study in there, or -- and
5 it could be -- and look at EJ issues. So it wouldn't be
6 just statewide surveillance in a random fashion. We could
7 do something that's a little bit more targeted, that would
8 get at some of that randomness, as well as some of the
9 more specific issues we've been trying to address as well.
10 So that's -- you know, we're kind of playing that game
11 right now.

12 CHAIRPERSON BRADMAN: If I were to make some
13 comments here, I would change biomonitoring children to
14 biomonitoring pregnant women and children. And that kind
15 of addresses the question of prenatal exposures.

16 When I look at this list, to me it seems perfect,
17 in terms of priorities. You know, but really the question
18 that comes up is do you have the resources to do it? And
19 I think that's kind of an ongoing challenge, and, you
20 know, will guide the feasibility of individual pieces of
21 this.

22 One question I have you just mentioned about you
23 have an ideal budget. Is there any proposal for a budget
24 change proposal or some other submission to try to, you
25 know, amplify those resources to more fully fill out these

1 priorities?

2 DR. DiBARTOLOMEIS: I'm trying to figure out how
3 to answer that without getting in trouble.

4 CHAIRPERSON BRADMAN: Apologies, if I shouldn't
5 have asked the question.

6 DR. DiBARTOLOMEIS: We were -- I think it's fair
7 to say that the upper management in the Department of
8 Public Health asked for what it would take to optimize the
9 program, and even add a little bit more, meaning that, you
10 know, some things that are more discretionary.

11 You know, what would it take to make this Program
12 function at its optimal level, laboratory-wise, as well as
13 from the epi and, you know, toxicology side and
14 communication and all that? So there is something written
15 out, but it's internal. And probably the mechanism is not
16 going to be the budget change proposal mechanism. It
17 probably has to come through a different path. It just --
18 that approach is so competitive and so difficult. Given
19 that we would have to be also identifying funding sources,
20 it's just really a very hard thing to do.

21 It's better to have it be communicated as we're
22 trying to do to various audiences and get their interest,
23 so that they're actually asking for the information from
24 us, and that's what we're trying to do, I think.

25 CHAIRPERSON BRADMAN: Can I ask, and I'm going to

1 drill down a little deeper, and this is -- you know, if
2 it's not appropriate -- I mean, one thing I think about,
3 for example, DPR has the Mill tax, and their funding is
4 not through the General Fund.

5 There's work being done pesticides by
6 biomonitoring. Is there an opportunity to collaborate
7 with them and use some of those resources to answer
8 questions that they might have? And are there other
9 similar revenue streams that might kind of enhance the
10 Program that would, you know, address pressing
11 environmental and public health issues from different
12 agencies in the State, but also in general serve the
13 State?

14 DR. DiBARTOLOMEIS: Well, first, let me say that
15 the Mill tax and the Department of Pesticide Regulations
16 funds do support -- partially support the Program. There
17 are funds coming in from that. And therefore, doing
18 pesticide work, I think, is important to do. Going beyond
19 kind of some basic having the panel -- you know, the
20 pesticide panels that we do, we haven't yet approached
21 CalEPA and DPR to see if there are funds and interest to
22 go out and do something more, I guess, robust, for lack of
23 a better word.

24 I actually don't know. Well, let's put it
25 another way, since 2012 when I came on board, I have not

1 had a single discussion with Department of Pesticide
2 Regulation about biomonitoring. That is, in part,
3 probably my mistake, because I probably should be going
4 there and seeing if they're interested. But it also
5 might -- it might be a two-way street. I'm not so sure
6 that we -- that they are wanting to put funds into
7 something along these lines. I just don't know.

8 And maybe the folks at the agency at CalEPA might
9 know better. You know, I don't know if OEHHA has any
10 comment on something like this or not, but -- okay.

11 So basically, but I -- you know, you're raising
12 an idea, and no idea is a bad idea. So I guess what I can
13 say is it's worth me kind of scratching my head a little
14 bit on and seeing if I can find out a little bit more.

15 CHAIRPERSON BRADMAN: On a related piece to
16 something I perhaps am starting to sound repetitive, but
17 this issue of like if we were actually to show a decline
18 in exposures related to diesel, or I think there's been
19 tremendous work done that we heard about today related to
20 declines in flame retardants, and there's also been some
21 other published literature on that.

22 You know, I think that when we look at the cost
23 of those industries, in just dollar terms, and the
24 potential public health impacts in terms of health and
25 care and that sort of thing, we're also talking about

1 enormous dollars.

2 So I think the Program, at least the component of
3 it, where we can generate information that show changes
4 related to policy, and regulation, and even perhaps
5 translating that into some sort of dollar figure or some
6 sort of, you know, implication of the benefits, I think it
7 can really show both the value of the Program, potentially
8 the value of the impacts of the regulations relative to
9 the economic costs of implementing them, and perhaps could
10 strengthen the Program in a way that would make it more
11 visible, and maybe it would be easier to get those extra
12 resources.

13 Again, I just think the power of showing changes.
14 You know, we started about the same time in environmental
15 health, and everybody shows that picture of gasoline lead
16 going down and blood lead going down in tandem. And the
17 more that we -- not the more, but it just underscores the
18 value of that image in really helping people understand
19 what environmental health means, and what exposure
20 reduction means, and how biomonitoring can inform that.

21 DR. DiBARTOLOMEIS: I agree.

22 CHAIRPERSON BRADMAN: Anymore discussion?

23 Well, I think on our agenda right now we have a
24 last, and perhaps a bit longer, public comment period.
25 Although, we've had a number of kind of -- it seems at the

1 end of the day, these kind of wrap together. But we have
2 another opportunity for public comment. So we have 15
3 minutes for that and then we have some time for wrap-up
4 and adjournment.

5 Any new public comments?

6 I'll repeat, are there any email submissions?

7 DR. PLUMMER: No.

8 CHAIRPERSON BRADMAN: No.

9 Okay. Well, at this point then, should we
10 wrap-up?

11 Sara, any last comments?

12 MS. HOOVER: (Shakes head.)

13 CHAIRPERSON BRADMAN: Well, then, I think we've
14 had a lot of good discussion today. And I just want to
15 kind of end the meeting with a few points.

16 One, that a transcript of this meeting will be
17 posted on the Biomonitoring California website when it's
18 available. And also to let you know that the next
19 Scientific Guidance Panel meeting is on July 28th, 2016.
20 And that will be in Richmond at this time at the CDPH
21 building.

22 So at that point, then I think --

23 ACTING DIRECTOR ZEISE: Let me then offer my
24 thanks to the Panel for really robust discussions. Really
25 appreciate your input. And you've given us a lot to think

1 about, especially on the diesel marker. That was
2 something that we've been grappling with for eight years,
3 or something like that -- since the beginning of the
4 Program. So I thought it was very, very helpful to hear
5 about that.

6 And I want to thank the audience on-line and here
7 in the room, and, of course, our staff who is amazing and
8 put together a wonderful set of materials to talk about,
9 and all their good work preparing for the meeting. So
10 thank you, everybody.

11 CHAIRPERSON BRADMAN: Thank you, Lauren. And I
12 want to reiterate too, I don't think I do enough of that,
13 really just to thank everyone in the Program who works on
14 this. I've known many of you for years, and it's
15 really -- it's really just astounding how much work gets
16 done and how important it is.

17 So on behalf of the Panel, I want to extend that
18 thank you as well.

19 ACTING DIRECTOR ZEISE: And to all the speakers.
20 I forgot to thank the speakers in the morning.

21 CHAIRPERSON BRADMAN: So I guess, at this point,
22 we're adjourned.

23 (Thereupon the California Environmental
24 Contaminant Biomonitoring Program, Scientific
25 Guidance Panel meeting adjourned at 4:04 p.m.)

1 C E R T I F I C A T E O F R E P O R T E R

2 I, JAMES F. PETERS, a Certified Shorthand
3 Reporter of the State of California, do hereby certify:

4 That I am a disinterested person herein; that the
5 foregoing California Environmental Contamination
6 Biomonitoring Program Scientific Guidance Panel meeting
7 was reported in shorthand by me, James F. Peters, a
8 Certified Shorthand Reporter of the State of California,
9 and thereafter transcribed under my direction, by
10 computer-assisted transcription.

11 I further certify that I am not of counsel or
12 attorney for any of the parties to said meeting nor in any
13 way interested in the outcome of said meeting.

14 IN WITNESS WHEREOF, I have hereunto set my hand
15 this 17th day of March, 2016.

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19 

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