

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

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
RICHMOND CAMPUS AUDITORIUM
850 MARINA BAY PARKWAY
RICHMOND, CALIFORNIA

THURSDAY, JULY 28, 2016
10:04 A.M.

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

PANEL MEMBERS:

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

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

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

Oliver Fiehn, Ph.D.

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

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

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

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

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

Lauren Zeise, Ph.D., Acting Director

Amy Dunn, Research Scientist III, Safer Alternatives
Assessment and Biomonitoring Section

Sara Hoover, Chief, Safer Alternatives Assessment and
Biomonitoring Section

Shoba Iyer, Ph.D., Staff Toxicologist

Frank Kammerer, Staff Attorney

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

DEPARTMENT OF PUBLIC HEALTH:

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

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

DEPARTMENT OF PUBLIC HEALTH:

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

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

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

GUEST SPEAKERS:

Benjamin Blount, Ph.D., Chief, Tobacco and Volatiles Branch, Division of Laboratory Sciences, National Center for Environmental Health, Centers for Disease Control, and Prevention (CDC)

Paul English, Ph.D., M.P.H., Branch Science Advisor, Environmental Health Investigations Branch, California Department of Public Health(CDPH)

ALSO PRESENT:

Nancy Buermeyer, Breast Cancer Fund

Shelley DuTeaux, California Department of Pesticide Regulation

Rachel Kubiak, Western Plant Health Association

Emily Marquez, Pesticide Action Network

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

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P R O C E E D I N G S

DR. PLUMMER: We're going to begin the meeting now. And I just want to let everyone know today's meeting is available via webinar by going to our website and clicking on the July SGP meeting. And I would just remind everyone to please speak directly in the microphone and introduce yourself before you speak. This is for the benefit of the people on the webinar listening, and also for the transcriber.

So the materials for the meeting will be provided to the SGP members and posted on the Biomonitoring California website. And there are some folders with copies of the agenda, presentations, and documents at the table near the entrance.

And today, we'll have a break around 1:15 for lunch, and another short break at 2:45. And the restrooms are located right out the back, as well as the emergency exits.

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

Lauren.

ACTING DIRECTOR ZEISE: Thank you, Laurel. Good morning, everyone. I'd like to welcome everyone, the Panel and those listening in the room and on the website

1 to this meeting of the California Scientific Guidance
2 Panel for the California Environmental Contaminant
3 Biomonitoring Program, also known as Biomonitoring
4 California. So thank you all for participating in this
5 important meeting.

6 So our last meeting was held in Sacramento on
7 March 3rd, 2016. And at that meeting, the Panel
8 participated in a special session around biomarkers of
9 diesel exhaust exposure. We heard from special guest
10 speakers Dr. Chris Simpson of the University of Washington
11 and, Dr. Vanessa Galaviz of California Environmental
12 Protection Agency. And a key conclusion from this
13 discussion was that metabolites of 1-nitropyrene are
14 useful biomarkers for diesel exhaust. And I think we'll
15 be hearing a lot more about that at future meetings of the
16 Panel.

17 We also heard very interesting research from Dr.
18 Luderer on polycyclic aromatic hydrocarbons. And we heard
19 Program updates and laboratory updates. And the Panel
20 provided lots of very useful information, input, and
21 recommendations to Biomonitoring California. So there's a
22 summary of the Panel's input and recommendations, and a
23 complete meeting transcript on our website at
24 www.biomonitoring.ca.gov.

25 So now, I'll turn the meeting over to the Chair

1 of the SGP, Dr. Asa Bradman.

2 CHAIRPERSON BRADMAN: Thank you very much. I
3 also want to welcome all the Panel members to today's
4 meeting. And also thank you all for attending both here
5 in person and on the web. I think today is going to be a
6 very interesting both in terms of the discussions and
7 presentations this morning and also this afternoon when we
8 talk about pesticides, a critical issue in California
9 agriculture, which is so important to our economy, and
10 also, you know, raises concerns around exposures and
11 possible health concerns.

12 Just to announce the goals for today's meeting,
13 this morning we'll receive Program updates and provide
14 input on that to the Program. We'll also be discussing
15 activities of the National Biomonitoring Program with Dr.
16 Benjamin Blount. I look forward to his presentation. Dr.
17 Blount is from the CDC and has been involved in
18 biomonitoring for many years.

19 And again, this afternoon, we'll have a special
20 session on pesticide biomonitoring and discuss strategies
21 and practical next steps for Biomonitoring California.

22 We're hoping that the Panel and the public will
23 provide input on possible pesticide classes for future
24 consideration as potential designated chemicals. So
25 that's going to be an important topic.

1 Just a reminder for each agenda topic, we have
2 time provided for Panel questions, public comment, and
3 Panel discussion and input. And just a reminder on how we
4 handle public input for the meeting, which is really
5 critical to the Program, and we want to make sure everyone
6 feels welcome and is invited to provide comments. If you
7 would like to comment on an agenda item, please fill out a
8 comment card, which can be obtained from the table near
9 the entrance. Turn the cards into Amy Dunn. There's Amy
10 raising her hand over there. If you're joining the
11 meeting via the webcast, you can provide comments via the
12 email biomonitoring@oehha.ca.gov, OEHHA being O-e-h-h-a.

13 Emailed comments relevant to the topic under
14 discussion will be read aloud during the meeting and
15 entered in the record. Public comments will be subject to
16 time limits, and if needed the time allotted will be
17 divided equally among all the individuals wishing to speak
18 on that agenda item, usually though we have plenty of
19 time.

20 Please keep comments focused on the agenda topics
21 being presented. There will be an open public comment
22 period as the last item of the day for any comments
23 related to biomonitoring concerns or issues that are
24 important to you.

25 So now I want to introduce Dr. Michael

1 DiBartolomeis. He is Chief of the Exposure Assessment
2 Section, California Department of Public Health, and lead
3 of Biomonitoring California. And he'll provide a budget
4 update, introduce our first speaker of the day, Ms. Robin
5 Christensen. So thank you, Michael.

6 DR. DiBARTOLOMEIS: Is this on?

7 MS. CHRISTENSEN: No, it's not.

8 DR. DiBARTOLOMEIS: Now?

9 (Laughter.)

10 DR. DiBARTOLOMEIS: Now, I'm on.

11 So thank you, Asa, for that introduction. I'm
12 sure glad you did that, because I'm sure people would have
13 confused me with Robin. So I just wanted to -- that's
14 good to know that.

15 And I want to say, you know, welcome to everybody
16 on the Panel, everybody in the room, and a special welcome
17 back to Megan. It's great to see you.

18 (Applause.)

19 DR. DiBARTOLOMEIS: So before I turn the podium
20 over to Robin, I'm actually going to introduce somebody in
21 the audience, and then as well as I will give a brief
22 summary of the update on the status of our budget, one of
23 your favorite topics. So the first thing I want to do is
24 to point out Kristin Dortch, who's sitting right there.
25 Kristin is the project officer for the State based Public

1 Health Laboratory Biomonitoring Cooperative Agreement for
2 CDC, otherwise just our project officer. She's taken that
3 position over from Lovisa Romanoff. So we welcome her.
4 She's been in this world for a while, but she -- this is
5 her first meeting, so...

6 And actually, she has a background in chemistry.
7 So she's worked as an analytical chemist in the Organic
8 Analytical Toxicology Branch in Tobacco and Volatiles
9 Branch. I thought we had long names in State government.

10 (Laughter.)

11 DR. DeBARTOLOMEIS: Her research was on
12 biomonitoring analysis of serum cotinine for the National
13 Health and Nutrition Examination Survey, NHANES. She
14 serves as the 2016 Women's Chemist Committee Chair in the
15 Georgia American Chemical Society.

16 So, welcome. Ben will be introduced later.

17 So let me just go to the first slide after this
18 one.

19 (Thereupon an overhead presentation was
20 Presented as follows.)

21 DR. DiBARTOLOMEIS: Do I have that?

22 Oh, here it is

23 --o0o--

24 DR. DiBARTOLOMEIS: I like being the first
25 speaker because all the technical glitches get worked out,

1 you know.

2 (Laughter.)

3 DR. DiBARTOLOMEIS: There we go.

4 Thank you, Robin.

5 MS. CHRISTENSEN: You're welcome.

6 DR. DiBARTOLOMEIS: A little bit of -- just a
7 little bit of an Update. Just as a reminder, for the
8 past -- since 2007 or so, we've had core funding. That
9 hasn't really changed much. And that core funding is from
10 five special funds, which include the majority of funds,
11 are coming from the Toxic Substances Control Act fund,
12 TSCA fund. And we have about 13 -- I think, it's 13 State
13 positions that are core positions in the three
14 departments.

15 What's changed is that when the second CDC grant
16 was granted or, you know, we're able to receive those
17 funds, it was less than the original grant amount. And so
18 you all know that history. And so there's been a series
19 of budget change proposals prepared by the Program and
20 approved by the -- approved and eventually inserted into
21 the budget to allow for some partial compensation for the
22 loss -- or the reduction, I should say, in federal funds.

23 But they have come at a -- in a kind of strange
24 way that you would not normally want to do if you were the
25 person running a program. They come in two-year cycles.

1 So you're getting some positions for two years, and then
2 you have to re-ask for them again. And this has happened
3 in two, two-year cycles, so every year we're asking for
4 funds for the coming two years for those positions.

5 So we did successfully gain back two -- the
6 positions that were from the first round of BCP, which is
7 I think four total positions, two in CDPH, and two in
8 DTSC. I may be wrong. There might be one in DTSC, but
9 nobody is here from DTSC to probably correct me anyway.

10 And so we were successful to get another round of
11 two-year funds, and the positions were made permanent. So
12 we now have permanent positions, not limited-term
13 positions. So at least we don't have to ask for position
14 authority anymore.

15 The other thing that is really great news, thanks
16 to our very efficient and great stakeholders, that support
17 this Program, they were able to convince both the
18 legislature and the Governor to include in this year's
19 budget \$1 million for the Program in -- out of the general
20 fund, which in and of itself is news --

21 (Laughter.)

22 DR. DiBARTOLOMEIS: -- for environmental justice
23 focused work. And this is a one-time allocation with the
24 hope, I think, at least from our perspective, that if we
25 do great things, that it will become more -- maybe a

1 continuous or annual funding.

2 But again, you know, this is -- we have one year
3 to spend these funds. We are looking into ways to extend
4 the spending period, not the amount of money, but the
5 spending period for greater than a year. And later when
6 Robin is on a slide like 7 or something, she'll be giving
7 some more specific exploration ideas in how we want to use
8 these funds for EJ, and then we definitely want to hear
9 back from the Panel on if any ideas pop into your minds.

10 And finally, I thought -- well not finally, but
11 in terms of State funds, I thought I would give you a
12 little prognosis on 2017/18, which is now -- we're in that
13 process now of requesting funds for that year.

14 We are interested in the second set of positions
15 that were given to us that were of limited term. We're
16 trying to get those to be permanent term, and we're hoping
17 that we can get annual funding for those instead of
18 two-year, so that's what our hope is.

19 So the prognosis, I think, is good. I just don't
20 know how it's going to be for permanency. So we'll --
21 stay tuned for that. In terms of federal funds, it was
22 announced we did receive notice that our CDC grant has
23 been renewed for the coming -- it's actually not federal
24 fiscal year really. Technically, it's the grant fiscal
25 year. But nevertheless, the -- that we have another year

1 of funding which is great. So thank you, CDC.

2 So with that, unless there are any questions, I
3 would like to introduce Robin. What the little thing here
4 doesn't say is Robin has been my right-hand person since I
5 started in this Program, almost four years ago.

6 And so I'm going to give you a very dry summary,
7 but she does so much more than what I'm going to read.

8 Robin is the Biomonitoring California Grant
9 Coordinator, and she administers -- in administering the
10 CDC Cooperative Agreement. So her primary role is really
11 ensuring that the CDC grant deliverables adhere to our
12 Program's strategies, schedule, and budget. Prior to
13 joining Biomonitoring California, she worked in community
14 violence prevention for 10 years, with roles in
15 surveillance and evaluation, research, and practice. She
16 also managed a CDPH, California Department of Public
17 Health, funded project to improve access to domestic
18 violence services for people with disabilities.

19 So with that, I am turning the microphone over to
20 Robin.

21 MS. CHRISTENSEN: Thanks.

22 MS. DUNN: If you haven't been able to look at
23 the webinar, the slides are on the meeting page. So you
24 can look at them that way.

25 MS. CHRISTENSEN: Okay. Can you hear me?

1 All right. Thank you, Michael, and good morning,
2 everyone.

3 --o0o--

4 MS. CHRISTENSEN: So I am going to start off with
5 a staffing update, and also go into a few project updates.
6 So I am very happy to announce that Dr. Crispo-Smith is
7 now the Research Scientist Supervisor in the Biochemistry
8 Section at the Environmental Chemistry Laboratory.

9 We are also very fortunate to be welcoming so
10 many new staff to the Biomonitoring Program. Dr. Shoba
11 Iyer has been working with OEHHHA for some -- for a while
12 now. And she is now 50 percent on Biomonitoring
13 California. Dr. Juan VillaRomero is a new staff at the
14 Environmental Chemistry Laboratory, and he was previously
15 an EPA Star Fellow at Berkeley. Dr. ShiZhong Wang and Dr.
16 Rosario Amado are both new to EHLB. And Dr. ShiZhong Wang
17 is working on the PAH analyses. And Dr. Amado is working
18 on our non-targeted screening program.

19 I also want to welcome Ms. Hiu-Mei Ma and Alex
20 Nguyen. They are currently not here today. They are out
21 in the field working the ACE Project. And I also really
22 would like to thank Dr. Laura Fenster who retired in
23 April, and Dr. Gail Krowech, who will be retiring in
24 September. They've both helped this Program out quite
25 tremendously, and we thank them very much and wish them

1 well.

2 Jeffrey Aduviso has been our sample manager, and
3 he has left the Biomonitoring Program, but he's still
4 within CDPH, so he hasn't gone too far.

5 --o0o--

6 MS. CHRISTENSEN: Moving on to Program updates.
7 I'm going to be providing you with an update of some of
8 our existing projects, and then also move into a few
9 projects that we're going to be looking forward to.

10 --o0o--

11 MS. CHRISTENSEN: Starting off with the ACE
12 Project. The Asian and Pacific Island Community Exposures
13 Project. This is a partnership with APA Family Support
14 Services. And the idea is to biomonitor Chinese adults
15 living in the Bay Area for a panel of metals, which
16 include lead, mercury, cadmium, total and speciated
17 arsenic, and also PFASs.

18 I don't want to jinx anything, but this
19 community-initiated project has been very successful. We
20 started out in the field in June of 2016, and we are
21 rapidly nearing our initial conservative enrollment goal.
22 We plan on enrolling people through October, and we've
23 increased our enrollment goal to now 80.

24 --o0o--

25 MS. CHRISTENSEN: And Hiu-Mei Ma and Alex are not

1 here today, so we've provided you with a slide here.
2 They're actually out in the field, and we are
3 collecting -- we're doing phlebotomy and doing additional
4 interviews and urine collection

5 --o0o--

6 MS. CHRISTENSEN: Okay. Our FREES Study is also
7 at a pretty exciting juncture. FREES is the Foam
8 Replacement Environmental Exposure Study. And it's in
9 partnership with Dr. Deborah Bennett of UC Davis. This
10 study is comparing levels of PBDEs and OPFRs before and
11 after foam furniture replacement. It's a baseline, and
12 then six, 12, and 18-month follow up. We are sampling
13 serum and urine for PBDEs and OPFRs. And UC Davis is
14 analyzing the dust samples from those same households.

15 We have two different groups as a part of this
16 FREES Study, San Francisco East Bay is a voluntary group
17 that they volunteered to replace their furniture. We
18 currently have 21 participants from 13 households
19 enrolled. And we have returned their baseline results and
20 we are in the process of collecting their six-month
21 samples.

22 San Jose is a partnership with First Community
23 Housing. We're recruiting from this First Community
24 Housing. They -- we currently have three participants
25 from three households, and the baseline sample collection

1 is complete. We don't anticipate to enroll anymore than
2 the three.

3 --o0o--

4 MS. CHRISTENSEN: So moving on to our next study,
5 the Biomonitoring Exposure Study. I don't think we've
6 actually updated on Expanded BEST in awhile. This is a
7 project that measured environmental chemical exposures in
8 350 Kaiser Permanente residents in the Central Valley.
9 And last August, we returned results to participants, and
10 those results found that 30 of the participants had
11 elevated inorganic arsenic levels. And we did our
12 follow-up protocol, which involves a follow-up survey, and
13 we tried to identify potential sources of exposure in
14 these individuals.

15 And in some of them it was a little bit unclear.
16 Our survey didn't find anything that was a clear
17 pinpointed reason for the increased arsenic.

18 And so internally, we decided as part of clinical
19 follow up, we would offer a retest. And so we contacted
20 these participants, and 25 of the 30 expressed interest in
21 having a repeat test and having their urine analyzed
22 again.

23 And of those about half of them actually followed
24 through and mailed us their samples. And those samples
25 have been analyzed, and the data is currently under

1 quality review. They have not yet been returned to
2 participants.

3 --o0o--

4 MS. CHRISTENSEN: Moving on to the MAMAS Project.
5 So we reported about a year ago that we had found metals
6 contamination in the MAMAS samples. And since that
7 meeting, EHLB has actually conducted subsequent
8 experiments. And unfortunately, we've found that the
9 metals contamination is not only widespread, but that it
10 varies within lot and between lots. We also found that
11 for some of the analytes the contamination actually
12 increases over time, holding time within the vials.

13 So with no way to reliably control for the metals
14 contamination, we have actually removed the metals from
15 the scope of work. We will still be analyzing samples for
16 PFASs, PBDEs, PCBs, and OCPs.

17 This map here depicts the geography of our MAMAS
18 sampling. And the counties that are shaded in orange are
19 the second batch of samples. Our labs are currently
20 analyzing the samples for those analytes I mentioned. The
21 third batch we've put in a request to GDSP, and we're
22 currently in their queue. I do not have a projected date
23 for when the samples will be transferred.

24 The Central Valley counties that are unshaded,
25 these counties are part of biobank and we are un -- we

1 opted not to sample from those counties, because there's a
2 two-year waiting period on the samples, and the sample
3 volume is half as much as what we can get from the other
4 counties.

5 --o0o--

6 MS. CHRISTENSEN: Okay. A little bit about some
7 of the additional Program work. And I feel a little bit
8 bad, because both Myrto and June-Soo are not here. So
9 this is -- this is -- this is a shorter slide than we
10 would usually offer for our additional complementary
11 Program work.

12 Jianwen's lab has been working on the
13 Firefighters Occupational Exposure Study analyzing the
14 archived samples from the prior grant period for
15 organophosphate flame retardants. And those results are
16 currently in QA and very near to release.

17 The -- his laboratory, EHLB, is also working on
18 the Pregnancy, Environmental and Lifestyle Study, which is
19 a partnership with Kaiser Permanente. And they are
20 analyzing environmental phenols. And both laboratories
21 continue to work on additional laboratory method
22 development, including BPA alternatives and non-targeted
23 screening.

24 So the next couple of slides are looking forward
25 at our upcoming projects. And I really need to caveat

1 here that it's very preliminary. And so we're presenting
2 this here for preliminary feedback. Unfortunately, I
3 don't have too many details to share on either of the
4 projects.

5 --o0o--

6 MS. CHRISTENSEN: Now, because the MAMAS scope of
7 work has changed, we were able to redirect funds to
8 support a multi-regional surveillance study. We are
9 currently in the planning phases of this. The goal is to
10 approximate a statewide sample over time.

11 We will be moving into region by region, and
12 expanding the -- starting with a pilot region hopefully
13 in -- near -- in Contra Costa, Sacramento, a county
14 something like -- near to us, and expanding out across the
15 State as the idea is better developed.

16 We are currently in the project planning phase,
17 and we feel that there are several benefits to this
18 approach over MAMAS. And one is that we will be able to
19 better control the sample collection. We will be able
20 to -- we will be able to select samples from men and
21 possibly children, in addition to women.

22 And we will be able to collect urine and whole
23 blood in addition to the serum. And not to mention, we
24 also will be able to collect exposure information. I
25 don't have too many more details to share on this project

1 at this point, but what we've proposed to CDC is that we
2 are likely to be collecting metals on all participants in
3 this multi-regional surveillance study, and that we would
4 target additional analytes to specific populations or
5 regions or to answer specific questions.

6 --o0o--

7 MS. CHRISTENSEN: Moving on to the environmental
8 justice projects. Michael made reference to these new
9 funds at the start of the presentation. We do have this
10 one-year augmentation of funding. And because they are a
11 one-year -- it's a one-year time frame here. We are on a
12 very accelerated timeline. The Program has already
13 started meeting internally to discuss how the funds might
14 be used, and we are reaching out to potential partners --
15 or we will be reaching out to potential partners.

16 Currently, we're exploring both outreach and
17 biomonitoring studies. In terms of outreach, we want
18 to -- we are trying to explore ways that we could report
19 back on our progress, and also reach out to community
20 groups. That might include listening sessions, and news
21 letters.

22 In terms of studies, we are currently
23 entertaining two studies. One involves diesel exhaust
24 exposure in children, which could compare exposures for
25 those who live near to freeways or ports with children who

1 are further away. And we're also looking at contaminants
2 in Asian and Pacific islander communities.

3 This would be similar to the ACE Project,
4 although in a different linguistic and probably a
5 different region of the State.

6 --o0o--

7 MS. CHRISTENSEN: And that would be it.

8 So I want to thank everybody in the Biomonitoring
9 California staff. They appear here. And I want to also
10 point out that Michael DiBartolomeis has finally made it
11 onto the thank-you staff slide.

12 (Laughter.)

13 CHAIRPERSON BRADMAN: Okay. Thank you so much
14 for that presentation. Right now, we have about five
15 minutes scheduled for Panel questions and then public
16 comment.

17 So, Mr. Cranor.

18 PANEL MEMBER CRANOR: Yes. I noticed that you're
19 picking up metals. Any idea why -- A, why you're
20 looking -- you must have an idea of why you're looking for
21 them, but what's your -- what do you anticipate is an
22 explanation for a lot of metal contamination?

23 MS. CHRISTENSEN: Oh, I'm -- you're referring to
24 the MAMAS project?

25 PANEL MEMBER CRANOR: Yes.

1 MS. CHRISTENSEN: Okay. So the MAMAS samples are
2 actually collected by GDSP, and we are not in control over
3 the collection materials or how the materials are stored.
4 And the serum separator gel is suspected to be
5 contaminated with a wide variety of metals. And we've
6 contacted GDSP to try to figure out is there any option?
7 Could we provide you with some suggestions of some like
8 different material -- different vials.

9 And GDSP is a far larger program than we are.
10 They were not super interested in changing their materials
11 on our behalf.

12 (Laughter.)

13 MS. CHRISTENSEN: But, yeah, there's something in
14 the serum separator gel that's just systematically causing
15 problems.

16 PANEL MEMBER CRANOR: Not necessarily a problem
17 in the population, but a problem in your testing process.

18 MS. CHRISTENSEN: It is -- there's metals in the
19 gel, so there's no way for us to separate out what is in
20 the serum versus what has been contaminating from the gel.

21 CHAIRPERSON BRADMAN: Are there any other
22 comments on that particular issue or questions?

23 MS. HOOVER: Not that.

24 CHAIRPERSON BRADMAN: I was just -- we may as
25 follow up on this issue of contamination. Are there any

1 other questions specific to that right now?

2 Because I had a couple. One, it might be worth
3 publishing that, just because, you know, that's an
4 important issue. I don't know if there's other states
5 dealing with this issue. But, you know, just as a
6 laboratory QA/QC issue, that might be worth getting out
7 there.

8 And then, number two, I'm a little concerned
9 about, and felt like the Program response was not as
10 cooperative as it could be. I understand when you have a
11 big program going and you have specific materials that
12 you're using to meet those needs. But it seems to me
13 there might be an opportunity here to work with them to
14 solve a problem that would benefit biomonitoring and
15 information about exposures in the State. So maybe there
16 could be a little bit of encouragement for more
17 cooperation to try to address that issue.

18 MS. CHRISTENSEN: Well, I don't mean to
19 mischaracterize GDSP as being uncooperative, because
20 they've been very cooperative with us overall in
21 developing this project, and working with us.

22 Nerissa Wu may be able to speak more about -- she
23 worked in GDSP prior to coming to biomonitoring. She may
24 be able to speak a little bit to that.

25 DR. WU: It's more that they are selecting tubes

1 to maximize their utilities, so they are looking for
2 optimum serum separation for the hundreds of thousands of
3 serum samples that they're pulling. And it's just not a
4 concern for their -- for the analytes they're looking for
5 for prenatal screening.

6 So it's just not on their radar, or is an issue,
7 and it would be a gigantic change for them in terms of
8 changing vendors and replacing all of the vials for the
9 clinics across the State that pull samples for something
10 that's very small, that that's not really part of their
11 mandate.

12 CHAIRPERSON BRADMAN: Right. Yeah, and I totally
13 understand that, and the challenges of making changes like
14 that. At the same time, there might be an opportunity
15 here to, you know, meet two goals, perhaps even on a
16 pilot basis, to kind of understand how to address it, and
17 still meet their Program needs, and expand that.

18 But I -- I mean, I totally understand the
19 challenge of making changes like that.

20 DR. WU: I do think there has been some
21 discussion within our group of publishing some of the
22 findings from our chemists, did some -- did systematic
23 review of the tubes, looking at very different -- a bunch
24 of different variables over time, different holding times
25 within lots and between lots. And I think there was talk

1 of publishing those results, as you mentioned in a QA type
2 of journal. And I think there are other researchers who
3 use biobank samples who would be very interested to learn
4 about this.

5 CHAIRPERSON BRADMAN: Exactly, yeah.

6 Okay. Dr. Schwarzman.

7 PANEL MEMBER SCHWARZMAN: I was just going to ask
8 about the availability of alternatives. And, I mean,
9 obviously, if we're collecting biological samples, there
10 are alternatives that aren't contaminated with metals.
11 But whether they do the serum separation adequately as
12 required for the GDSP program, because I think that would
13 determine a lot about the viability of suggesting
14 alternatives or getting in on their program.

15 And I think I also was wondering that just for
16 verification for the multi-regional surveillance study
17 that you're proposing to do instead of the metals analysis
18 in the MAMAS study that you have adequate methods for
19 that.

20 DR. WU: Are you asking me?

21 PANEL MEMBER SCHWARZMAN: (Nods head.)

22 DR. WU: We do -- I mean, we take samples for --
23 we collect samples for metals analysis, and we have tested
24 our serum separator tubes that we select specifically for
25 our Program. So there are vials available for

1 environmental sampling or for biomonitoring sampling. I'm
2 guessing they're more expensive, and they may not be
3 optimal for GDSP's purposes, but it's certainly something
4 we can look into further.

5 CHAIRPERSON BRADMAN: Dr. Quintana, you had a
6 question.

7 PANEL MEMBER QUINTANA: Can I move to a different
8 topic here?

9 CHAIRPERSON BRADMAN: Sounds good.

10 PANEL MEMBER QUINTANA: I had a question about
11 the multi-regional sampling. And that's getting much more
12 towards the original purpose of this Program, which was to
13 be an NHANES for California, as a short way of saying it.

14 Is there interest in kind of adding some of the
15 special populations that make California unique,
16 oversampling for those populations in that multi-regional
17 sampling. So California is very unique. It has lots of
18 different water sources. Some people drink on untested
19 wells in the Central Valley that might be contaminated
20 with legacy pesticides. Some people drink municipal water
21 in San Diego like I do, which tastes terrible, but it's
22 pretty safe actually.

23 (Laughter.)

24 PANEL MEMBER QUINTANA: And we have the U.S.
25 Mexico border. We have a lot of immigrants in San Diego.

1 We have something like the largest Iraqi population and
2 many other immigrants. And that's just our region, let
3 alone other regions.

4 And I'm just curious about how the sampling might
5 look at what makes California unique in that planning
6 process.

7 MS. CHRISTENSEN: Well, I can say that this is
8 something that we will definitely think about. We are in
9 the planning phases, and I mean very preliminary planning
10 phases. What we proposed to CDC is actually that we're
11 going to be designing this study over the course of the
12 next year. And we hope to be in the field in about a
13 year's time.

14 So we have time now to strategize and identify
15 specific groups that we might want to focus on. And I
16 think that this is a good opportunity for you to let us
17 know what you would suggest that we focus more on.

18 DR. WU: Can I add to that?

19 We have also talked about the possibility of
20 nesting specific cohorts within our statewide -- this
21 multi-regional plan, so that forming partnerships on a
22 regional basis with community groups or other potential
23 partners, so that we can identify those special pockets
24 that we'd like to nest within our broader statewide
25 surveillance would be great.

1 And it really dovetails nicely with this
2 environmental justice special projects augmentation that
3 we have now, where we now have the ability to do some
4 listening across the State to identify projects which
5 might be appropriate for our EJ funding, but will also
6 feed into our priorities that we can -- so that we can add
7 to our statewide surveillance.

8 CHAIRPERSON BRADMAN: I'm going to say just one
9 more question, then we have some public input scheduled,
10 and then we have actually some more time for Panel
11 discussion. So Dr. Fiehn, and then after that I know I
12 have some more questions, but maybe we'll hold off until
13 we have public comment. So we're a little bit behind
14 schedule, right?

15 PANEL MEMBER FIEHN: All right. I also --
16 looking at these programs, I see that there's a lot of
17 priority pollutants that have been tested. And that is
18 good. But this Panel also includes a lot of more
19 compounds every time we meet. And I always wonder a
20 little bit like what happens to those compounds?

21 And, you know, you said that there's also
22 initiatives to try to do untargeted screening, for
23 example, in these two studies where you say it's
24 additional Program work. And I wonder, you know, if any
25 of those chemicals that we have designated or any other

1 progress has been made that could be informative to our
2 Panel and to the public.

3 MS. CHRISTENSEN: I think generally the method
4 development would be covered by the labs.

5 Sara will --

6 MS. HOOVER: I'm just going to say that we're
7 going to hopefully have a very in-depth discussion of
8 non-targeted screening and hear from the labs in November.
9 We encountered, you know -- the two people that could
10 speak to this at ECL actually are, one, Myrto is
11 unexpectedly out of town because of a family emergency.

12 So just stay tuned. But definitely. And I know
13 that DTSC is making excellent progress, for example, on
14 non-targeted screening of PFASs, which was a group that
15 the Panel added to the priority list. So that -- and, you
16 know, you'll hear later -- I mean, that's obviously one of
17 the drivers for when we bring chemicals to the Panel and
18 we try to look by class, that's actually one of the
19 drivers to allow that sort of broader non-targeted
20 screening.

21 DR. SHE: I'd like to answer some comments to
22 Oliver Fiehn's comment about untargeted analysis. And so
23 actually both labs are so far working on the untargeted
24 analysis. So like Sara already mentioned the class. If a
25 chemical belong to same class that you probably easily to

1 use the same approach to solve it.

2 So generally, you have targeted analysis,
3 suspected chemicals, unknowns. So we need to take
4 approach I think for us -- first, we look at targeted, but
5 there's many things that we do not know. But if we
6 suspect metabolite, for example, we know the parents with
7 suspected metabolite. This ones is relatively easy than
8 the complete unknown.

9 So for suspected things, for example, EHLB --
10 EHLB is doing right now work around the BP-3, this group
11 of chemicals, to see that over 70 BP-3 chemicals can we
12 find all of them. So we made some progress.

13 And also a lot of ways to do the unknowns we
14 think, if we can combine the current traditional panels,
15 bundle the different panel together, and then that's -- we
16 call it mass method. We have developed a mass method, we
17 call it comprehensive method, to see we can see beyond the
18 targeted analyte.

19 So that's a few approaches we are taking, and
20 then we make some progress in it. And yesterday, we
21 actually able to show our CDC program officer. I think
22 very soon I hope the Program can publish some unknowns.
23 But overall, we are taking the step like targeted,
24 suspected, unknowns.

25 MS. HOOVER: Thank so much Jianwen. So let's go

1 to public comment.

2 CHAIRPERSON BRADMAN: Yeah. Thank you. Yeah.
3 So now we have some time scheduled for public comment, and
4 are there -- is there anyone that has requested?

5 MS. DUNN: Currently, we don't have any public
6 comments for this period.

7 CHAIRPERSON BRADMAN: All right. So that means
8 we can actually continue with our -- both perhaps
9 clarifying questions and also Panel discussion. We have
10 about 15 minutes scheduled for that.

11 I know I have a couple of questions related to
12 your presentation. One on the Expanded BEST. You
13 mentioned that 30 participants had elevated inorganic
14 arsenic in the samples. That seems like, out of 350,
15 that's, you know, just under 10 percent of participants.
16 I think that's pretty dramatic. And I wonder if you could
17 comment more on how elevated and were there concerns about
18 potential health risks, and were there thresholds that
19 were possibly crossed.

20 And you've mentioned there's been some follow-up
21 testing, but I'm quite surprised at, you know, that
22 frequency in terms of elevated arsenic exposure.

23 MS. CHRISTENSEN: Yes. There were thresholds
24 that were crossed. That's -- our threshold is identifying
25 them as having elevated inorganic arsenic. And is Duyen

1 here today?

2 I don't think so.

3 Sara is going to have to jump in and help. She
4 worked closely with Duyen on contacting the participants.

5 MS. HOOVER: Yeah. So -- well, what would you
6 most like to hear about, because we could talk a lot about
7 the arsenic program. In fact, we're working on a paper,
8 and it's going to be -- as Robin mentioned, it's going to
9 be very interesting this second round of testing, and
10 that's why we did a second round of testing.

11 CHAIRPERSON BRADMAN: Right.

12 MS. HOOVER: And I think actually Jianwen, at a
13 previous meeting, presented our protocol. And the
14 inorganic arsenic level, and actually I'm going to give a
15 shout-out to Shoba Iyer too who is another colleague that
16 worked on developing the protocol.

17 And what we did was we actually based it on a CDC
18 paper where they had identified the 95th percentile of the
19 combined inorganic species. And so that's what we did.
20 It was a statistically based level of concern for
21 inorganic arsenic. So that's what we were looking at.

22 So, you know, we're in a different region, and we
23 know that there's some issues with arsenic in the Central
24 Valley, so it wasn't hugely surprising that we saw that
25 there, but we definitely want to follow up on it. We have

1 a really extensive questionnaire that we've been
2 interacting with the participants on, collecting
3 information about how they might have been possibly
4 exposed. And like Robin said, Duyen Kauffman has been
5 really amazing with her ability to interact with the
6 participants, get information, provide information, and
7 provide them help with how they might be exposed. So we
8 should learn more once we get these results back.

9 CHAIRPERSON BRADMAN: So this is basically --
10 it's not a risk-based threshold, it's more the 95th
11 percentile of NHANES.

12 MS. HOOVER: For inorganic arsenic, true. The
13 total arsenic is a level of concern identified from CDC.
14 But as you know, you might recall casting your mind back
15 that no we're not actually using risk-based thresholds.
16 However, as part of our paper, we might look into, you
17 know, examining that issue.

18 I also want to mention as a last thing, which I
19 didn't mention, that we've also worked very closely with
20 Dr. Craig Steinmaus, who's an arsenic expert. He helped
21 us with the protocol, the questionnaire, the follow-up,
22 everything. And he's actually the physician who will
23 speak to participants, if needed.

24 CHAIRPERSON BRADMAN: Okay. Thanks for that
25 additional information. I think all of us, I know myself,

1 really look forward to hearing more about that.

2 Dr. Luderer.

3 PANEL MEMBER LUDERER: Is this on?

4 Yes.

5 I just wanted to get back just to ask a little
6 bit more about the multi-regional surveillance study. I
7 know it's just in the planning stages, but as far as the
8 sampling methodology, is that -- you know, are you
9 thinking of modeling it after the type of sampling -- the
10 cluster sampling that's used for NHANES or is there any
11 thought about that yet?

12 MS. CHRISTENSEN: So we're entertaining a couple
13 different ideas. We have achieved a lot of success with
14 ACE working with the community group. And we initially
15 thought that working with community groups across the
16 State might be a nice model that we could expand, but
17 we're not ruling out other options.

18 And, for example, we're looking into adding on a
19 question to an existing questionnaire, such as the CHIS or
20 the -- another State is using the BFRSS survey to collect
21 interest in participating in a biomonitoring survey. So
22 we might explore those options as well. We are open to a
23 number of options.

24 DR. DiBARTOLOMEIS: Hi. This is Michael
25 DiBartolomeis. I just wanted to add on as memory recall

1 for you all, we have estimated what it would take to do an
2 NHANES for California. And I just want to remind you what
3 it would -- what it would -- what we would need. We think
4 at least 2,000 samples every other year to make it
5 statistically, and randomly, and -- you know, sound. And
6 with the additional results returned, and laboratory
7 efforts, et cetera, et cetera, we estimate somewhere
8 around the order of 10 to 12 million dollars a year.

9 The current budget for this Program, with all
10 things considered, doesn't go past five million, and
11 that's to do other things as well. So we're not close to
12 being able to do what the original intent of the
13 legislation was, which was is a California HANES, or
14 whatever.

15 So we do know that this multi-regional study is
16 not what is intended, but it's -- we think it's
17 approaching something that will at least give us some data
18 on what you might expect from representative populations
19 in California.

20 And as Nerissa pointed out, we can also nest
21 maybe specific exposure concerns or particular
22 environmental justice concerns or whatever in these kinds
23 of things. But we are not anywhere near being able to do
24 a California HANES.

25 So I just wanted to -- I know Robin is too, you

1 know, politically savvy to not say that, but I'm going to
2 say it.

3 (Laughter.)

4 DR. DiBARTOLOMEIS: So thank you.

5 CHAIRPERSON BRADMAN: Dr. Quintana.

6 PANEL MEMBER QUINTANA: Just following up on that
7 comment. Would it be possible to restrict geographically
8 or by exposure -- let's say L.A. is a lot of people.

9 MS. CHRISTENSEN: Yes.

10 PANEL MEMBER QUINTANA: And a lot of it is pretty
11 similar from a San Diego perspective where I live.

12 (Laughter.)

13 PANEL MEMBER QUINTANA: So who's here from L.A.?
14 Oh, all you guys.

15 (Laughter.)

16 PANEL MEMBER QUINTANA: But joking aside, I mean,
17 could -- would it be possible to -- you know how the
18 National Children's Study which was trying to get a
19 representative sample. They randomly chose certain, you
20 know, zip codes, and what have you. And then within that,
21 I'm just wondering if there is some way to still have the
22 random aspect of NHANES, and the careful sampling, instead
23 of just who's volunteering, you know, maybe by restricting
24 to certain areas or types of areas we're interested in.
25 Let's say urban L.A., farmland in the Central Valley or, I

1 don't know, some -- I'm not -- I'm just brainstorming
2 here, but some way to kind of capture the power of the
3 sampling strategy without having to have so many people, I
4 guess.

5 MS. CHRISTENSEN: I think these are very good
6 suggestions, and things that we'll be considering as we're
7 developing the study further.

8 CHAIRPERSON BRADMAN: Yeah, Dr. Schwarzman.

9 PANEL MEMBER SCHWARZMAN: This may be a little
10 bit far out, and it touches on something that we'll be
11 hearing a lot more about this afternoon, but I just wanted
12 to kind of flag it in the context of talking about focuses
13 for the multi-regional sample surveillance study, and also
14 it dovetails for me with the budget for EJ studies.

15 Because it occurred to me as I was reading some
16 of the materials in preparation for this afternoon about
17 the California Environmental Health Tracking Program study
18 of pesticide use near schools that we'll be talking about,
19 how -- what excellent sort of initial information that is
20 that could inform a biomonitoring study comparing the, you
21 know, 15 highest use counties -- children in the 15
22 highest use counties, particularly looking at the schools
23 where there was the most exposure -- or there was the most
24 pesticide use if the vicinity compared to lower exposure
25 counties or schools with the lowest pesticide use in the

1 surrounding areas.

2 Anyway, I just wanted to raise it now. We can
3 talk about it more in the afternoon. But in the context,
4 since there's these studies that are sort of funded but
5 still being designed, about whether that might be a
6 possible place to put further investigation of this
7 pesticide use near schools.

8 MS. CHRISTENSEN: I mean pesticides is a great
9 topic to bring up today. I mean, Shoba will also be
10 discussing additional pesticide classes. Our lab
11 currently has a pesticide panel, and it doesn't capture
12 the most commonly used pesticides in California, so it's
13 something that we're aware of and we're trying to address
14 by designating additional classes.

15 And the labs are also exploring how they might be
16 able to bring on additional methods or expand existing
17 methods, but we're not there yet.

18 PANEL MEMBER SCHWARZMAN: So am I understanding
19 you right in saying that's kind of premature for the uses
20 of this study, and the EJ focused funds that need to be
21 done kind of in the next year.

22 MS. CHRISTENSEN: (Nods head.)

23 PANEL MEMBER SCHWARZMAN: Okay. Thanks.

24 CHAIRPERSON BRADMAN: Is there any other?

25 Thank you, Dr. Schwarzman. That -- you know, one

1 of the questions that was brought up really to us in this
2 presentation, I think we got a little -- we got focused on
3 some details, but I wanted to take it back to the end of
4 this environ -- you know, the promotion of -- the planning
5 for some environmental justice related projects related to
6 that funding that Governor Brown signed. So I'd be
7 interested to hear more discussion about that in
8 particular.

9 And I know probably people out in the public will
10 want to comment on that too, and maybe we missed that this
11 time. But I think that was an important point that was
12 brought up in this presentation, and I hope later on today
13 we can hear on that issue.

14 So, Dr. Luderer, did you have a comment on that?

15 PANEL MEMBER LUDERER: No.

16 CHAIRPERSON BRADMAN: Okay. Well, I know I do.
17 And I think you kind of hit on that issue, both in terms
18 of pesticide use as perhaps prioritizing regions for
19 monitoring. And I think, in general, too, I think there's
20 a lot of opportunities to look at issues around
21 environmental health, and then actually taking the next
22 step into epidemiology with EnviroScreen. And think
23 perhaps to the extent that we can use EnviroScreen to
24 guide perhaps choices around biomonitoring, that would be
25 a way that really has been vetted by a lot of both

1 scientifically and has a lot of community input, an
2 opportunity to perhaps use that as a way to prioritize
3 biomonitoring.

4 I know there's been some talk about, you know,
5 what it means for diesel exhaust, but perhaps other kinds
6 of exposures we might consider with EnviroScreen and
7 perhaps that can guide, you know, biomonitoring related to
8 environmental justice issues.

9 MS. CHRISTENSEN: Yeah. Thank you for bringing
10 that up. That has been part of our internal discussions.
11 And Amy Dunn has actually been working closely with the
12 CalEnviroScreen team to look at the data that they have
13 available and see how it might complement our approach to
14 environmental justice-focused projects.

15 CHAIRPERSON BRADMAN: Dr. Quintana.

16 PANEL MEMBER QUINTANA: Sorry, I don't want to
17 monopolize the conversation here, but I just want to echo
18 what you said about pesticides. I know that the two
19 bullet points you had in the environmental justice slide
20 were just projects currently under discussion. And I'm --
21 I just want to reiterate that I think pesticides is one of
22 the areas very in need of looking into for environmental
23 justice in general, and specifically very suitable for the
24 expertise and the measurement opportunities provided, you
25 know, by this Program.

1 But from a practical point of view I just
2 wondered if you could comment about if you're going to be
3 talking to people, or archive samples, how much -- could
4 you use urine, do you want serum, and how much of it would
5 you need, in general, if you were going to bring people to
6 participate? Could you just comment on the practical
7 issues a bit?

8 MS. CHRISTENSEN: Oh, in terms of sample
9 collection?

10 PANEL MEMBER QUINTANA: In terms of how much you
11 would need. You know, 2 ml of serum, and you want, you
12 know, urine --

13 MS. CHRISTENSEN: I mean, it would depend
14 entirely on the panels and how many panels we would be
15 analyzing.

16 I'm sorry, Sara Hoover.

17 MS. HOOVER: Just to clarify, do you mean --

18 PANEL MEMBER QUINTANA: For pesticides
19 specifically.

20 MS. HOOVER: Okay. For pesticides. So let's
21 see, Jianwen, could you comment on the volume of sample
22 for like the current pesticide panel?

23 DR. SHE: Currently, for the organophosphorus
24 pesticide, our lab working on the urine samples, is about
25 1 to 2 milliliter of urine samples for DAPs, and for

1 specific OP pesticide, that's what we do.

2 But the pesticide, especially OP pesticide, our
3 laboratory look for DAPs. We look for specific OP. We
4 also look OPFR. From structurally, you see OPFR
5 metabolite, also a DAP. That's what I talk about how we
6 bundle them together. If we're able to bundle all of the
7 classes this afternoon we talk about, because organic
8 phosphorus pesticides tend to be very polar. They have
9 some common features. If we're able to bundle them
10 together, the volume will be changed.

11 So that's what when we -- I also comment on Dr.
12 Oliver Fiehn's question what's the laboratory try to do,
13 what's a comprehensive method to go a little bit beyond,
14 which can reduce the requirement on the volume of samples,
15 reduce the resource. That's the laboratory kind of
16 working. We hire Dr. Amado continue working on it. We
17 already combined over 35 chemicals together, but we still
18 need to explore can these things be very practical.

19 Thank you.

20 PANEL MEMBER QUINTANA: So if we were talking to
21 community groups, you could say they want urine -- am I
22 hearing you say urine?

23 MS. CHRISTENSEN: Yes.

24 PANEL MEMBER QUINTANA: They don't need blood,
25 which is easier sometimes. And then just a small like 10

1 ml, 20 ml.

2 DR. SHE: (Nods head.)

3 MS. HOOVER: Robin, can I?

4 This is Sara. And just to -- that was pesticide
5 related, but as you saw, we're also looking at diesel
6 exhaust exposure project, and we've been having
7 conversations with Asa and Chris Simpson. And that volume
8 is a little bit higher currently. I think you were
9 collecting in a previous project 10 to 30 ml, something on
10 that order?

11 CHAIRPERSON BRADMAN: Yes. Well, we collected
12 more than that, but the analysis initially required 100
13 ml. And he's been able to reduce it to 30 for the diesel
14 related metabolites.

15 PANEL MEMBER LUDERER: I just have a question,
16 since I'm also very excited about the environmental
17 justice projects and the funding for that. And I was
18 wondering -- and I -- since I understand that there is a
19 certain amount of time pressure for this, whether
20 you've -- one of the -- or some of the reasons for
21 choosing the communities or the exposure, the diesel
22 exposure in the Asian and Pacific islander communities is
23 because they're already ongoing community groups and -- or
24 community-based outreach that's been going on, and if so
25 if you could -- in those areas, that you could talk a

1 little bit more about?

2 MS. CHRISTENSEN: Well, certainly. So the
3 environmental justice projects, focused projects, you
4 know, we want to have community involvement. And as you
5 know, getting the community involved is a long process.

6 With the original ACE Project, we've been working
7 with the community group for probably about 10 years
8 within CDPH. And we've been working with them for about a
9 year on the ACE Project itself before even engaging
10 formally with them.

11 So, yes, it is very helpful to work with groups
12 that we currently have a relationship with, and who have
13 already expressed an interest in biomonitoring, and using
14 biomonitoring to help explain some of the exposures.

15 DR. DiBARTOLOMEIS: Can I just add a little bit
16 more onto that? This is Michael D.

17 I didn't mention it as part of the funding. The
18 money -- the \$1 million for this year has a prescribed
19 split amongst the three departments. And so I want to
20 just point out there are a couple of things about that
21 that I think are important to understand. So about a
22 quarter of a million dollars went over to OEHHA, \$600,000
23 came over to CDPH, which is to be split between the lab
24 and the EHIB portion, and then \$150,000 went over to DTSC.

25 We're still trying to figure out where the labs

1 fit into the spectrum, because our laboratory analyses
2 will come -- would come later on, and more in support of
3 the initial design -- study designs, et cetera. But one
4 of the things that the Environmental Health Investigations
5 Branch has identified as one of the top priorities is to
6 hire an environmental justice coordinator.

7 And we're hoping we can do this over a two-year
8 period instead of just a one year period. And part of the
9 reason for doing that is to start the process of nurturing
10 the relationship with the community. Because just as you
11 were saying, it is true that one of the reasons why we can
12 jump right onto the ACE Project is because a lot of that
13 work over the past decade has already happened. We have
14 built trust in those communities, and we have to do the
15 same around the State for others.

16 So we're hoping that a coordinator with a
17 specific task of one of them to do that would be a
18 positive outcome so at the end of the year, we would be
19 able to tell potential future funders that we have set it
20 up, and we're really poised and ready to now do more
21 studies in these areas, but we -- you know, we had to do
22 the initial legwork.

23 CHAIRPERSON BRADMAN: So Dr. Cranor then Dr.
24 Schwarzman.

25 PANEL MEMBER CRANOR: Following up the Asian

1 Pacific Islanders group, do you have antecedent reasons to
2 think that there are unusual exposures there?

3 I mean, I probably missed the meeting where this
4 started. So you just need -- I'm asking you to bring me
5 up to date a bit.

6 MS. CHRISTENSEN: Yeah, yeah. So there are
7 certain communities of have they have differential
8 exposures of due to either diet, or they have a lack of
9 access to information due to linguistic or cultural
10 isolation. And so that's why we started engaging with APA
11 in the first place. They are doing a lot of education
12 surrounding fish consumption. They know that there's
13 metals contamination in the fish. APA was actually --
14 they learned from this Program that they could also --
15 they might also be contaminated with PFASs or PFCs.

16 So biomonitoring is really a tool in which we can
17 drive those messages home, and make it more real to the
18 community. So, yeah, we do expect that there are certain
19 communities we know that there are people who are -- are
20 fishing for much of their diet. And some of the lakes,
21 rivers, streams in California are polluted with metals.

22 CHAIRPERSON BRADMAN: So I'm going to have just
23 one more question from Dr. Schwarzman, and then to stay on
24 time, we want to move to hear Dr. Blount's presentation.

25 PANEL MEMBER SCHWARZMAN: Thanks. Just one more

1 sort of inquiry and potential suggestion around this
2 environmental justice funding. I was very interested to
3 hear that in the FREES Study, there's -- is this a public
4 housing location?

5 MS. CHRISTENSEN: Yes.

6 PANEL MEMBER SCHWARZMAN: Yeah, for one of the
7 sampling areas. And I'm very interested in the idea of
8 incorporating public housing into -- and public housing
9 residents, and, you know, the dust and all that, the way
10 it's being done in FREES into the biomonitoring.

11 And so this strikes me as an area where you
12 potentially have an existing collaboration, but it sounded
13 like maybe that was a weak partner. You said it's kind of
14 limited the number of households who've participated and
15 you don't anticipated more. So I just wanted to hear a
16 little more about that.

17 MS. CHRISTENSEN: Well, FREES is unique in that
18 we are not the people who are reaching out to the
19 participants. We -- our partner, UC Davis, is actually
20 developing the pool of participants from which we can
21 approach. So people are initially approached by UC Davis
22 to participate in this study, and then we follow up with
23 them to see if they also would like a biomonitoring
24 component added on to the study. So our pool is small to
25 begin with.

1 In terms of working with community housing, one
2 of the options that we are considering -- it wasn't on the
3 slide, but one of the things we are looking at is there's
4 a housing -- it's a nonprofit low-income housing community
5 in the Stockton area that largely serves an immigrant
6 Cambodian population. And they are interested. They have
7 been interested in working with us, and it's one of the
8 groups that we actually approached in a similar project
9 before that didn't work out. So they are on a long list
10 of potential partners.

11 CHAIRPERSON BRADMAN: I'm going to cutoff the
12 conversation right now, just so we stay on time. And
13 thank you very much for your presentation and discussion
14 that followed.

15 So I want to introduce Dr. Benjamin Blount now,
16 who's going to be speaking about CDC. Dr. Blount is the
17 Chief of the Tobacco and Volatiles Branch at the Division
18 of Laboratory Sciences, at the National Center for
19 Environmental Health at CDC. Over the last two decades,
20 Dr. Blount has developed and applied numerous analytical
21 methods for quantifying environmental toxicants and
22 biomarkers of exposure and effect.

23 Dr. Blount's recent research focuses on assessing
24 exposure to tobacco-related toxicants, volatile organic
25 compounds, and toxic anions by measuring biomarkers of

1 exposure to these chemicals. And Dr. Blount will provide
2 an update from the CDC's National Biomonitoring Program
3 with a specific focus on perchlorate and tobacco-related
4 exposures.

5 So thank you, Dr. Blount, welcome to California,
6 and we look forward to your presentation.

7 (Thereupon an overhead presentation was
8 presented as follows.)

9 DR. BLOUNT: Well, thank you, Asa and it's a
10 pleasure to be here to speak to this distinguished Panel
11 and to see so many past colleagues and collaborators.
12 I'll be here representing CDC's biomonitoring lab, and
13 specifically the Tobacco Volatiles Branch of which I lead.
14 We're now over 100 scientists looking at people's exposure
15 to environmental contaminants as well as, primarily now,
16 tobacco and tobacco emissions and trying to characterize
17 that through using biomonitoring.

18 MS. CHRISTENSEN: This isn't working.

19 DR. BLOUNT: Okay. I'll just say next slide.

20 I will start my talk by talking about what I
21 won't talk about, but referring -- I do have some slides
22 talking about targeted verse non-targeted analysis in the
23 bonus section of my presentation --

24 (Laughter.)

25 DR. BLOUNT: -- just for reference. Feel free to

1 look in there. Today's presentation that I plan will
2 focus exclusively on targeted analysis from within the
3 context of CDC's Biomonitoring Program. But I agree that
4 non-targeted analysis provides much promise from a systems
5 biology approach, and from understanding holistic health
6 impact of exposures in a variety of different angles.

7 But keep in mind the difference in approach and
8 the differences in how that data can be used.

9 So next slide, please.

10 --o0o--

11 DR. BLOUNT: So on my next slide, I will talk
12 briefly about perchlorates, and I feel a little bit of
13 coals to Newcastle here, in that California is very
14 familiar with perchlorates. And, in fact, my introduction
15 to perchlorate was through connections in California.

16 Perchlorate is a small inorganic molecule, one
17 chlorine, 4 oxygens that's used as an oxidizer in solid
18 rocket fuel. It also provides oxygen for other burning
19 products, things like fire works and explosives. Very
20 interestingly, it can also form in the atmosphere
21 naturally when sodium chloride from sea spray is
22 transported into the troposphere and can react with ozone.
23 So there's a natural formation pathway as well.

24 Next slide.

25 --o0o--

1 DR. BLOUNT: These different sources of
2 perchlorate lead to perchlorate in the environment.
3 Man-made leaching from industrial sites led to the
4 contamination of the entire Lower Colorado River of
5 course. That was characterized by the California state
6 lab. Also, natural atmospheric formation that I mentioned
7 can lead to accumulation of perchlorate over the
8 millennia, especially in arid regions where soil microbes
9 are not breaking that perchlorate down.

10 Lastly, formation of perchlorate can happen in
11 sodium hypochlorite solutions where that hypochlorite can
12 form chlorate and perchlorate, and that can also occur in
13 some water distribution systems at trace levels from that
14 same kind of reactive chlorine chemistry. Although that
15 last pathways is thought to be fairly minimal for human
16 exposure.

17 Next slide.

18 --o0o--

19 DR. BLOUNT: So the story that was worked out
20 over 15 years ago by the California state lab was
21 characterization of the contamination of the lower
22 Colorado River from a perchlorate manufacturing site
23 outside of Las Vegas, leading to massive contamination of
24 the Las Vegas wash, Lake Mead, and the entire lower
25 Colorado River, which is a big deal from folks drinking

1 that water, including Jenny's water there in San Diego
2 County, and impacting even more people, the value of that
3 water for irrigation and food stuffs that are exported
4 internationally as well as shipped around the country.

5 Next slide.

6 --o0o--

7 DR. BLOUNT: So important agricultural districts
8 to remember around Yuma, also very importantly the
9 Imperial Irrigation District in Coachella Valley. And in
10 this area, I had the pleasure of working with Paul English
11 and Jianwen on a collaborative study looking at
12 perchlorate exposure in the Imperial Valley several years
13 back, and characterizing that individuals living in the
14 Imperial Valley did indeed have a higher perchlorate
15 exposure dose than the general U.S. population, likely
16 coming from the downstream effects from that contamination
17 of the Colorado River.

18 Next slide.

19 --o0o--

20 DR. BLOUNT: So these potential sources of human
21 exposure are leading to human exposure, either through
22 direct consumption of contaminated matter or through crops
23 grown with contaminated water or contaminated fertilizer
24 or soil. The perchlorate being concentrated, especially
25 via -- in the green leafy outpart of the plant.

1 Also, a very important source of exposure are
2 dairy products, because those forage crops that are fed to
3 dairy cattle lead to exposure of the cow. Perchlorates is
4 actively transported into milk in mammals, and that can be
5 passed on to consumers of those -- of that milk.

6 Next slide, slide 7.

7 --o0o--

8 DR. BLOUNT: So the mode of action of perchlorate
9 is shown in this graphic from the Utah Department of
10 Environmental Quality. And it's basically inhibition of
11 iodide uptake through a competitive mechanism, at the --
12 primarily at the sodium iodide symporter. Although in
13 some work we did together with collaborators, we showed
14 that both sodium iodide symporter and pendrin another
15 transmembrane transporter, transport perchlorate at the
16 expense of not transporting iodide.

17 So as an analytical chemist and a biomonitoring
18 person, we wanted to improve the value of our perchlorate
19 method by adding some more of the toxicologically relevant
20 other ions that relate to the mode of action of
21 perchlorate. So we added the biologically bioavailable
22 form of iodine -- yeah, of I iodine, iodide, as well as
23 three -- the three physiologically most relevant
24 inhibitors, perchlorate, thiocyanate, and nitrate to that
25 single assay, so we could have more information about the

1 iodide uptake inhibition milieu for the study participants
2 at that point in time.

3 With this approach, we were able to show that
4 perchlorate exposure was associated with decreased thyroid
5 hormone levels in -- primarily in women with low iodide,
6 and very interestingly also women with higher thiocyanate
7 levels from smoking. So, I mean, health is a holistic
8 endeavor. And I think it's quite interesting to see at
9 this interface between environmental exposure, tobacco
10 smoke exposure, and poor nutrition where we would see
11 those compounding to lead to a link with less thyroid
12 hormone levels in a target population.

13 And just a shout out to Craig Steinmaus for
14 working with us on some of this important regression
15 modeling.

16 Next slide, please.

17 --o0o--

18 DR. BLOUNT: So on slide 8, I guess that's my
19 introduction. So the question, what have you done lately?
20 You know, what's really -- what's happening now with
21 perchlorate. So just a brief update on that in two areas.
22 One is some very exciting new work in collaboration with
23 Neil Sturchio, and also with Craig Steinmaus, where we've
24 looked at different sources of perchlorate exposure,
25 looking at subtle differences that tell us whether it's

1 synthesized perchlorate or naturally-formed perchlorate.

2 And then lastly, building on the strength of
3 NHANES, to look at trends of perchlorate exposure in the
4 U.S. population now that we have a decade and a half and
5 almost 30,000 individual study participant urines that
6 we've analyzed for perchlorate.

7 Next slide.

8 --o0o--

9 DR. BLOUNT: And with that first question of
10 characterizing perchlorate exposure from synthetic versus
11 natural sources, we looked at these subtle differences in
12 chlorine-36 and -37 isotopes. Now, to do this, we need a
13 lot of urine, because a typical person only has low part
14 per billion concentrations of perchlorate in their urine.
15 So for a typical U.S. resident, that's about 30 liters of
16 urine.

17 (Laughter.)

18 DR. BLOUNT: So for our Atlanta study, we had a
19 144 full void volumes that we pooled from three dozen
20 study participants and isolated the perchlorate from that.
21 We also worked together with Craig Steinmaus with some of
22 the residual urines he had from studies in northern Chile
23 to collect and pool urine and isolate perchlorate from
24 that population in a very different region with different
25 naturally occurring perchlorates from the Atacama Desert,

1 very common in their drinking water and in their food
2 sources.

3 And lastly, we compared the perchlorate we
4 isolated from these different pools of urine with
5 perchlorate isotope patterns specified based on synthetic
6 perchlorates and perchlorate isolated from Chilean soils
7 in groundwater water and perchlorates isolated from
8 naturally occurring deposits in groundwater in the western
9 and southwestern U.S.

10 Next slide.

11 --o0o--

12 DR. BLOUNT: Our procedures are shown here. Just
13 know that the -- the key -- two keys in this, one that we
14 have a very selective resin for extracting the perchlorate
15 from all that urine, and then two very sensitive methods,
16 the secondary ion mass spectrometry followed by
17 accelerator mass spectrometry to be able to quantify these
18 subtle differences.

19 Next slide.

20 --o0o--

21 DR. BLOUNT: So here's what we found. The
22 circles are the environmental samples that define the
23 isotopic pattern, the differences in chlorine-36 and
24 chlorine-37 with red showing the western, southwestern
25 U.S. isotopic pattern with a 95th percentile confidence

1 ellipse -- confidence interval ellipse drawn around it.

2 The turquoise color is the Atacama Desert-collected
3 environmental samples, and the white synthetic industrial
4 perchlorate samples from several different manufacturers.

5 The two squares are urine results from the urine
6 pools.

7 Next slide.

8 --o0o--

9 DR. BLOUNT: And you can see when we unblended
10 these and identified them, that the Atlanta urine pools
11 pattern -- the naturally occurring western, southwestern
12 isotopic pattern, and the urine pool from Taltal, Chile
13 matched, not surprisingly, the isotopic pattern of the
14 Atacama Desert, which is the local perchlorate in their
15 exposure sources.

16 So the Chilean result was definitely what we
17 expected. The American result I think is very
18 instructive, that it would argue that, at least for the
19 Atlanta population, where there's no local sources of
20 perchlorate, that the driving source of perchlorate
21 exposure is from natural occurring sources, primarily
22 those in the western and southwestern U.S.

23 Next slide.

24 --o0o--

25 DR. BLOUNT: So just conclusions here on slide 12

1 restating what I just stated. I do want to underscore
2 that we're very excited to have an opportunity with some
3 residual NHANES urine samples, but we're pooling about
4 25,000 NHANES -- residual NHANES urines using the weights
5 of those corresponding study participants so that the
6 resulting pool is representative of the population, and
7 then isolating the perchlorate from that and testing that,
8 and doing the same kind of approach.

9 And lastly, collecting some urine pools from
10 people who are handling synthetic perchlorate as part of
11 their job, and having that isotopic pattern as well to
12 kind of complete to connect all the dots for this kind of
13 comparison. So stay tuned for that one.

14 Next slide.

15 --o0o--

16 DR. BLOUNT: So with our perchlorate trend
17 analysis, we looked at basically posing the question have
18 urinary perchlorate concentrations decreased since 2001,
19 as many proactive states have limited drinking water
20 perchlorate levels, unlike the federal government, where,
21 to my knowledge, there's still no MCL. There's been a
22 movement in that direction, but it's late in coming.

23 There also has been no regulation of food
24 perchlorate levels. And as results from my lab and other
25 groups have shown, for the U.S. as a whole, we tend to get

1 our perchlorate exposure through food. And so not much
2 action in some key areas, but definitely some action, some
3 improvement in the lower Colorado River, for example,
4 where the river is consistently under a part per billion
5 for perchlorate. So we wanted to look at trends for the
6 U.S. population to see if there had been a decrease.

7 Next slide.

8 --o0o--

9 DR. BLOUNT: And this is what we see in slide 14,
10 we're -- thank you -- the data are -- three of the
11 age-stratified data is in three panels with children in
12 the top panel with data from 2001/2002 through 2011/2012.
13 And you can see basically perchlorate exposure in the U.S.
14 has not changed significantly over the 12-year study --
15 the 12-year period study.

16 We do consistently see a pattern where children
17 have higher perchlorate exposure levels than adults and
18 adolescents, likely because they're consuming more
19 perchlorate-rich foods per kilogram body weight.

20 Next slide.

21 --o0o--

22 DR. BLOUNT: And on the next slide, let's see, I
23 think I'm transitioning into, yes, biomarkers of tobacco
24 exposure.

25 So a little bit of a harsh break, but I want to

1 cover what folks are interested in talking about. And
2 certainly, for us, we -- with my group, we started looking
3 at thiocyanate, because it's related to iodide uptake
4 inhibition. It's also a good biomarker of exposure to
5 smoke because of the cyanide levels in smoke, and
6 thiocyanate is the primary metabolite of cyanide.

7 So I'll be talking about thiocyanate and a number
8 of other biomarkers. But I think with biomarkers of
9 exposure to tobacco and smoke, it helps us to answer many
10 relevant questions, either directly related to tobacco
11 smoke or tobacco product use as part of a study's design
12 or to rule-out tobacco as a source of benzene, for
13 example, in the fracking study, or other environmental
14 exposures that can also occur from tobacco, because
15 tobacco smoke contains a lot of harmful chemicals that are
16 also of interest from completely environmental exposure
17 routes.

18 Next slide.

19 --o0o--

20 DR. BLOUNT: On slide 16, we have a lot of
21 tobacco-related biomarker work now at CDC. Notably, our
22 ongoing effort, started by Tom Bernert nearly 30 years ago
23 to measure serum cotinine. We've added now hydroxy
24 cotinine to that. We're also measuring nicotine and
25 nicotine metabolites and minor tobacco alkaloids in human

1 urine. So these are, of course, excellent biomarkers of
2 exposure to tobacco.

3 Also, tobacco-specific nitrosamines, as the name
4 implies, are specific to tobacco and tobacco products, and
5 so are an excellent way to identify exposure to tobacco
6 products.

7 Most of the rest of the list is a listing of
8 smoke constituents, primarily to answer the old adage
9 that -- or to comment on the old adage that nicotine is
10 the hook that brings the smoker back time and time again
11 to the habit, but it's the smoke that kills.

12 So with understanding a rapidly changing set of
13 tobacco products, and more and more people, not just
14 exclusively smoking cigarettes, but rather the dual users
15 of cigarettes and e-cigarettes or even poly-users,
16 understanding the population harm related to that
17 addiction and trying to advise policymakers on policies
18 that can reduce population harm.

19 So certainly VOCs are important, both measured in
20 blood as well as metabolites in urine, as well aromatic
21 amines, such as forming a biphenyl, a variety of different
22 aldehydes that we're measuring either as metabolites or
23 adducts -- Schiff base adducts to albumin in a method that
24 was developed in the Bruce Ames lab at Berkeley.

25 We're also looking at heterocyclic amines,

1 volatile nitrosamines, PAHs, thiocyanate as part of the
2 toxic anion screen, and then a number of different toxic
3 metals. And also to comment on an earlier comment, yes,
4 our metals biomonitoring lab has grappled with some of
5 those same issues. And I agree with the conclusions of
6 the Panel, that this would be something useful to discuss
7 in the methodological literature.

8 Next slide.

9 --o0o--

10 DR. BLOUNT: So on slide 17 -- next please.

11 --o0o--

12 DR. BLOUNT: -- just some -- given the specific
13 question about tobacco exposure biomonitoring, yes, our
14 recommendation is cotinine as an excellent measure for
15 both active use as well as second and third-hand use
16 with -- this work is -- I think the review, the table that
17 I'm showing here was from the early 80s by Neal Benowitz
18 and a group at UCSF. Also, Tom Bernert at CDC really
19 pioneered some efforts in this area.

20 So nicotine and nicotine biomarkers whether in
21 serum or in urine are quite valuable for detecting
22 exposure to nicotine, and tobacco products. But we need
23 to make sure -- also, it's very useful to include
24 combustion products as well.

25 Next slide, please.

--o0o--

DR. BLOUNT: Oh, yeah, and one methodological issue, just from the lab's perspective here on slide 18, analytical tools are improving over time, and we're able -- because of improvements in sample preparation and automation, improvements in chromatographic resolution, improvements in mass spectrometry, we're able to analyze more samples faster typically with greater sensitivity without compromising accuracy or precision, and to do so at less cost.

So just to note that your laboratories are constantly working to do things better, faster, cheaper.

Next slide.

--o0o--

DR. BLOUNT: Also, toward the goal of interaction with Biomonitoring California, and the broader biomonitoring community, CDC is very interested in harmonization of methods, whether it be just beer napkin discussions of common sources of standards and issues, or more formal involvement with development, for example, with the National Institutes of Standards and Technology in development of reference materials, both certified reference materials, and standard reference materials, publications, and exchange.

We've had staff come to CDC for training, and

1 we've certainly learned a number of things from State
2 labs. We also try to take advantage of the Phoenix
3 Project at NIH as a way of exchanging methodological
4 information.

5 And lastly, round-robin sample exchanges as a way
6 to get a sense of the state of the science in laboratories
7 that are measuring compounds of interest. The graphic is
8 from Tom Bernert's round-robin for serum cotinine. Tom
9 and Neal Benowitz are currently putting together a
10 round-robin for urinary nicotine and nicotine metabolites.
11 And we'd invite anyone who's interested in that to contact
12 me, and I'd love to connect you with that in that process.

13 Next slide.

14 --o0o--

15 DR. BLOUNT: So I've already commented on this,
16 just the value of both serum cotinine and urinary nicotine
17 metabolites. Keep in mind in the increased value of
18 measuring different metabolites, so that you can get a
19 functional assessment of nicotine metabolism, which are
20 very important implications for addition and related
21 exposures.

22 Also, of course, any time you're measuring a
23 urinary biomarker, they need to adjust for dilution caused
24 by variable hydration of the study participants.
25 Creatinine is effective. We're exploring more and more

1 the use of urine flow rate as a way to get a
2 creatinine-independent measure that's not affected by lean
3 body mass or dietary factors.

4 Next slide.

5 --o0o--

6 DR. BLOUNT: Next slide.

7 So here -- and one more click -- just clicking
8 through the nicotine metabolites that we're measuring.

9 Next slide.

10 --o0o--

11 DR. BLOUNT: And also the minor tobacco
12 alkaloids, anatabine and anabasine, which provide a nice
13 handle for -- quite often for looking at compliance for
14 people who say that they are exclusively using
15 pharmaceutical nicotine, a patch, or a gum, as opposed to
16 continued tobacco product use, where the tobacco product
17 contains the minor tobacco alkaloids and the
18 pharmaceutical grade nicotine does not.

19 Next slide.

20 --o0o--

21 DR. BLOUNT: So I mentioned the importance of
22 combustion biomarkers for understanding the harm caused by
23 the tobacco product use. Our leading candidate at CDC is
24 the acrylonitrile metabolite CYMA. It's a phase 2
25 detoxification end-product, mercapturic acid, but there

1 are a number of PAHs. The amino naphthalenes look quite
2 promising, 4-aminobiphenyl. Some heterocyclic amines we
3 hope to be publishing on soon also look very promising.
4 And 2,5-dimethylfuran was characterized two decades ago by
5 David Ashley at CDC, and Sid Gordon at Battelle, still a
6 very promising marker of exposure to tobacco.

7 And if you're a chemist in the lab preparing
8 these standards, this stuff smells just like a musty old
9 ashtray.

10 (Laughter.)

11 DR. BLOUNT: So, you know, you know that it --
12 your nose knows it. Also, some of the other VOCs and
13 aldehydes look promising as fairly selective markers of
14 smoke exposure.

15 Next slide.

16 --o0o--

17 DR. BLOUNT: We focus specifically on VOCs,
18 because there's quite a bit of harm from a hazard index
19 approach. The classic Fowles Dybing paper in tobacco
20 control of 2003 showing much of the -- a lot of the
21 carcinogenic impact of tobacco smoke comes from VOCs as
22 well as the respiratory irritation.

23 Next slide.

24 --o0o--

25 DR. BLOUNT: And when we look at these from an

1 analytical standpoint just a shout out to the
2 laboratorians in the room, you know this, trying to
3 develop these multi-analyte methods is a big challenge,
4 where, for example, for VOCs, very broad range in boiling
5 points from negative 13 degree C to 210 for the VOCs that
6 are listed in the Food and Drug Administration's harmful
7 and potentially harmful constituents list, also broad
8 polarities with the Henry's Law constants shown in the
9 slide as well.

10 And then lastly, these things can be reactive,
11 both when you're preparing your standards there can be
12 reaction. And also just physiologically, many of the
13 aldehydes and more reactive VOCs are -- cannot be detected
14 in serum as parent compounds, and we have to target
15 metabolites.

16 Finally, some of these compounds are, at least
17 historically, common laboratory solvents. And so, in some
18 ways, the laboratory is not a particularly good place to
19 measure part per trillion levels, because there's a jug of
20 it in the lab next door. So very careful techniques are
21 required in this.

22 Next slide.

23 --o0o--

24 DR. BLOUNT: When we apply these techniques here,
25 just -- it's a fairly busy slide, but a scatter plot

1 matrix of NHANES data showing how closely correlated the
2 monoaromatic VOCs are with themselves. The correlation
3 with cotinine not quite as strong, perhaps, somewhat --
4 something of a toxicokinetic factor, as well as some of
5 the people perhaps are getting cot -- are getting nicotine
6 from other sources.

7 The panel, at the far right, is for
8 1,4-dichlorobenzene, which is not in tobacco, but is
9 included as a negative control just to show what the
10 scatter looks like. So a lot of correlation of these
11 things. And just again, a reminder, as we've participated
12 in a number of studies of fence-line refinery exposures,
13 or fracking exposure, quite often what we find is the
14 elevated benzene results that we do find are coming from
15 the tobacco smoke, and not from the refinery.

16 Next slide.

17 --o0o--

18 DR. BLOUNT: And this fits with what we see in
19 tobacco smoke analysis. This is an analysis of 50
20 different U.S. brands that are machine smoke in a
21 standardized way in actually two different protocols. But
22 basically the take-home message from this busy slide is
23 that the smoke constituents tend to run together. The
24 more smoke, the more smoke toxicants with some variability
25 caused by differing levels of nitrate, for example, for

1 the nitrated VOCs, and some of the ketones. There's some
2 more complex formation chemistries involved.

3 Next slide.

4 --o0o--

5 DR. BLOUNT: Lastly, just the pun intended,
6 smoking gun here connecting the pattern of monoaromatic
7 VOCs that we see in the U.S. population for smoker's
8 blood. We see that same relative concentration of
9 toluene, benzene, xylenes, styrene, and ethylbenzene as I
10 see in tobacco smoke.

11 So certainly, from the U.S. population's
12 non-occupational exposure, benzene exposure, for example,
13 from tobacco smoke is a very important factor.

14 Next slide.

15 --o0o--

16 DR. BLOUNT: Just to wrap things up, tobacco
17 smoke exposure, as we see in the U.S. population.

18 Next slide.

19 --o0o--

20 DR. BLOUNT: In this next series of slides, I'll
21 be talking about data that underscore -- well, I guess I
22 first want to underscore that especially in NHANES
23 2013-2014, a lot of new analytes were added. These
24 classes of compounds are listed in this table. I don't
25 have time to go through them, but just for your reference,

1 these are there. I'd be glad to, you know, if you want to
2 know which VOC metabolites or which VOCs, I'd be glad to
3 follow-up with you separately.

4 Also, to correct one typo on this, starting
5 NHANES 2013-2014, we're actually starting at age three.
6 And I think that information will be available in the
7 public release data sets. Some of these will be continued
8 after NHANES 2013-14, depending on financial availability.

9 Next slide.

10 --o0o--

11 DR. BLOUNT: One of the reasons we're trying to
12 measure more than just nicotine biomarkers is to
13 understand this pattern in slide 30 -- these patterns of
14 exposure are a simple color cartoon. Green is low
15 background levels, yellow medium levels, red high levels,
16 are in typical cigarette smoker. All of these classes of
17 compounds shown in this slide are elevated non -- someone
18 without environmental tobacco smoke, lower levels, and
19 with secondhand smoke somewhat higher levels to these
20 constituents.

21 And then understanding the different patterns of
22 exposures we find with e-cigarette use, for example, or
23 smokeless tobacco use, and then using that to better
24 understand the population harm caused by the use of these
25 tobacco products.

1 Next slide.

2 --o0o--

3 DR. BLOUNT: So what does this data look like in
4 NHANES. So here, I'll be showing some overlaid histograms
5 of log 10-transformed data, blue being never tobacco
6 users, red exclusive smokeless tobacco users, and green
7 exclusive combusted tobacco users primarily, cigarette
8 smokers.

9 Next slide.

10 --o0o--

11 DR. BLOUNT: And so in this slide, you can see
12 the overlaid histograms for these two -- these three
13 categories. We see that on the right, offset very nicely,
14 the tobacco product users, both smokeless and combusted
15 tobacco, separated nicely from the non-users.

16 Next slide.

17 --o0o--

18 DR. BLOUNT: A similar pattern is seen in the
19 urinary NNAL, which is a biomarker of TSNA, tobacco
20 specific nitrosamine exposure, and a note that, yes, that
21 offset where smokeless tobacco users actually have higher
22 levels of these biomarkers than cigarette smokers is
23 something that has been characterized in the past, likely
24 caused by swallowing of some of the -- some saliva and
25 oral fluid from that tobacco product.

1 Next slide.

2 --o0o--

3 DR. BLOUNT: So arsenic -- inorganic arsenic, of
4 course, is being monitored as well. And there is some
5 inorganic arsenic in tobacco products. But as you can see
6 from this display, probably there are other sources in the
7 population that are more important than tobacco product
8 use, at least in this decade and a half sampling, where we
9 don't see any difference in tobacco use versus non-use for
10 this inorganic arsenic species.

11 Next slide.

12 --o0o--

13 DR. BLOUNT: So with some of these selective
14 combustion biomarkers, such as cyanide, you can see a very
15 nice separation where most of the smokeless tobacco users
16 have levels of CYMA similar to the non-users of tobacco.
17 There are a few individuals with higher CYMA levels more
18 similar to combusted tobacco users. And it will be nice
19 to follow up on this in a controlled fashion. We do have
20 a common practice where people, a lot of smokers,
21 underreport, shall we say, their use of smoke products.

22 Next.

23 --o0o--

24 DR. BLOUNT: Also two -- 2,5-dimethylfuran, a
25 very promising -- sorry, the title of the slide is

1 incorrect. This is blood 2,5-dimethylfuran, where most
2 non-users and smokeless tobacco users are non-detect for
3 2,5-dimethylfuran, and the smokers have elevated levels.

4 Next, please.

5 --o0o--

6 DR. BLOUNT: A quick shout out to the CDC
7 National Exposure Report. We're starting in 2011-12
8 actually, and the fourth NHANES, and the fourth report.
9 We have a separate section specifically for smokers, where
10 for assays that include biomarkers that are impacted by
11 tobacco smoke, we have a break out for smokers versus
12 non-smokers, and these are population-weighted. These
13 weights specifically factor in cigarette smoking. So an
14 additional section of potential use for reference.

15 Next slide.

16 --o0o--

17 DR. BLOUNT: And lastly, you note that lots of
18 times I talked about smoke instead of just tobacco smoke.
19 And as there's increasing recreational use of marijuana,
20 we are seeing an emerging pattern, both in the NHANES data
21 where we can't measure cannabinoids in urine because of
22 the federal government's stance on marijuana, but there is
23 question about recent use. When we studied that and
24 subtracted out exposure from tobacco, based on the
25 cotinine levels, we were able to see significantly

1 elevated levels of many smoke constituents in these
2 regular marijuana users.

3 And the graphic shown here - smoke carcinogens
4 acrylamide, acrylonitrile, thiocyanate, acrolein,
5 butadiene, and one of the PAHs or some of the PAHs - all
6 showing significantly higher levels in marijuana users
7 versus non-users. Sometimes the marijuana users had
8 levels as high as the cigarette smokers, but typically
9 they were somewhere between the non-users and the
10 cigarette smokers.

11 And this, of course, fits what you would expect
12 with smoke chemistry where marijuana smoke is likely to
13 contain many of the same combustion products as tobacco
14 smoke.

15 Next slide.

16 --o0o--

17 DR. BLOUNT: So I just want to wrap-up by
18 acknowledging many of the people who have contributed to
19 this in the group, and a shout out to colleagues, some of
20 who are in the room who have helped to do some of the
21 studies presented today. Jianwen somehow I forgot your
22 name on there.

23 So it's truly a pleasure to speak to the Panel
24 and to reconnect with Biomonitoring California
25 collaborators. So I'd love to address any questions you

1 have.

2 CHAIRPERSON BRADMAN: Thank you for that
3 presentation. Very comprehensive and interesting. So we
4 have time now again for some Panel clarifying questions,
5 and public comment, and also some opportunities for
6 discussion after that.

7 So why don't we start with Panel questions.
8 Dr. Cranor.

9 PANEL MEMBER CRANOR: Yes, I wanted to follow up
10 just a little bit about your carcinogens that were --
11 wherever that slide was. I don't remember. Can you
12 translate those concentrations into parts per million,
13 parts per billion? I saw some numbers elsewhere, but they
14 were harder to understand. I'm curious about the extent
15 of exposure.

16 CHAIRPERSON BRADMAN: Which slide was that?

17 PANEL MEMBER CRANOR: The volatile organic --
18 benzene. I can't find the slide, but I marked it
19 somewhere. Let me see, it's near the beginning, I think.

20 DR. BLOUNT: So I guess to -- just to broadly
21 comment on that, I think there's certainly that challenge
22 of understanding how does a measured biomarker level
23 relate to a toxicological benchmark or, you know, related
24 to the reference dose.

25 PANEL MEMBER CRANOR: Yes.

1 DR. BLOUNT: And there have been several
2 approaches to that reverse dosimetry, forward dosimetry
3 with both showing, for example, benzene. The levels of
4 benzene in a typical cigarette smoker's blood exceed what
5 would be expected from someone with an exposure at the
6 reference dose.

7 And so it's above that threshold value. Also,
8 from a biomonitoring equivalents approach, the -- that
9 same conclusion was reached. Lastly, again, I guess a
10 shout out to some work that was done here in the Bay Area
11 a long time ago in Ken Turteltaub's group showing that, at
12 least for benzene, it's a -- it looks like it's a linear
13 acting carcinogen with no threshold.

14 And so it certainly can be argued that if you
15 have a carcinogen that's acting and is linear down to
16 zero, that's not a good thing without that threshold.
17 So -- but certainly, that whole area of putting
18 perspective around a measured biomarker level is an active
19 area of work and an important area of work.

20 PANEL MEMBER CRANOR: Thank you.

21 CHAIRPERSON BRADMAN: Dr. Schwarzman.

22 PANEL MEMBER SCHWARZMAN: Thanks so much for this
23 review. It's really helpful to hear about the variety of
24 markers that can help distinguish environmental exposures
25 from cigarette smoke. Could you expand a little bit on

1 your discussion of the difference between biomarkers of --
2 between smokers and secondhand smoke, environmental
3 tobacco smoke exposure?

4 My understanding is there was -- I'm familiar
5 with some of the early work by Kathy Hammond on
6 environmental tobacco smoke in flight attendants, that --
7 and they measured the different components between
8 mainstream smoke and sidestream smoke, and, you know,
9 finding that cotinine wasn't a very good marker of
10 environmental tobacco smoke exposure, and what -- you had
11 one slide that showed a little bit, but it sort of -- sort
12 of the coarse resolution, slide number 30, that looks at,
13 you know, the relatively lower exposure to a lot of the
14 biomarkers in ETS exposures compared to mainstream, but it
15 doesn't distinguish among the biomarkers. Can you say any
16 more about sort of those finer grain details?

17 DR. BLOUNT: Yes. I guess, first, a comment. I
18 agree with the clarification that sidestream smoke
19 chemically is somewhat different than mainstream smoke.
20 And so there are some differences. There's more
21 smoldering, for example, and that can lead to -- just
22 modest differences, I would say. I would take exception
23 to saying -- to the statement that cotinine is ineffective
24 as a -- for measuring secondhand and thirdhand smoke
25 exposure. I think it's quite effective and selective for

1 that measurement.

2 If one understands that there are also -- there's
3 a modulation -- there are some different factors that
4 play, and Dr. Quintana has a lot of expertise in that
5 area. I -- one last comment. I don't have -- in my bonus
6 slides, I didn't put in a slide that would comment on your
7 thought around second- and thirdhand exposure, or people
8 who are not directly using smoking cigarettes, what do
9 their exposure levels look like for cyanide, for acrolein,
10 for benzene?

11 I do have some plots of that. And for many -- so
12 if you plot serum cotinine versus the acrolein biomarkers
13 we're measuring in urine, you see, that serum cotinine
14 below 10 are associated with elevated levels of acrolein
15 exposure, compared with the individuals who have no
16 secondhand smoke exposure.

17 So on slide 30, for example, I'm showing that in
18 cartoon form with the different colors. I do have -- I
19 can back that up with some graphics. Unfortunately, I
20 didn't put them in my slide deck. So it, in part, also
21 depends on how many other sources are common in that
22 population.

23 So while secondhand smoke does contain, let's
24 see, cyanide, we can also get cyanide exposure from
25 cyanogenic foods from -- and the biomarker, thiocyanate

1 can be found in milk. And so there -- that signal for
2 secondhand exposure is somewhat masked by these other
3 sources.

4 But it definitely -- secondhand smoke exposure is
5 a big deal both -- whether we're talking about tobacco
6 smoke or marijuana smoke.

7 CHAIRPERSON BRADMAN: Dr. Luderer.

8 PANEL MEMBER LUDERER: Yeah, I have actually a
9 question -- following up, a question about that same
10 slide. I was really interested in the e-cigarette
11 exposures. And one of the things that kind of jumped out
12 at me is the tobacco specific nitrosamines are increased
13 in the e-cigarette users. And isn't -- I mean, aren't
14 those mostly synthetic nicotine and where would the
15 tobacco-specific nitrosamines be coming?

16 DR. BLOUNT: And your -- so to comment on that,
17 note that it's yellow not red. And so, first of all,
18 e-cigarettes to date have been exclusively tobacco
19 extracts in the liquids, because then they are a tobacco
20 product that don't fall under FDA's regulation, otherwise
21 it's a drug delivery device, right? And so -- because
22 there's nicotine there.

23 And so it depends on that e-liquid. And because
24 it's a tobacco extract, work that we've and others have
25 done looking at e-liquids, some have found some NNN and

1 NNK, the levels are quite low compared to actually tobacco
2 products. So, you know, probably it would just -- it
3 would mainly be green with a little bit of yellow for
4 TSNA. So correction appreciated.

5 Also for aldehydes, for VOCs, and probably for a
6 lot of the trace metals. Well, let me hold that thought
7 on trace metals, but for aldehydes and VOCs, the levels,
8 except for some extreme conditions, are likely to be lower
9 than the levels found in cigarette smoke. Metals, it
10 depends. It depends on how the product is put together.
11 A lot of these are disposable and have lead solder joints,
12 and, you know, there's potential certainly for a lot of
13 different kind of metal exposure, but again, the field is
14 fairly young and it's a moving target.

15 CHAIRPERSON BRADMAN: All right. I had a couple
16 comments, and then we have some opportunity for public
17 comment and the discussion. But anyway, I just have one
18 comment and one question. The comment really is just
19 that, you know, your results for urinary perchlorate in
20 different age groups, I think is really interesting and
21 important, and just kind of underscores that often younger
22 people have higher exposures, and often relative to body
23 weight.

24 And this data actually almost perfectly reflects
25 the CDC NHANES data for DAPs, the organophosphate

1 metabolites. It's almost identical. And I've just
2 wondered, has CDC Biomonitoring considered sampling --
3 collect biological sample for kids younger than 6? And
4 that's something that we've talked about here, but I
5 wonder if that is a priority or perhaps something to
6 comment on?

7 DR. BLOUNT: Yeah. Thank you for that shout out.
8 And, in fact, in NHANES 13-14 that was piloted with three
9 to five year olds, and was a success. I don't know if
10 that data will be publicly released. But certainly in the
11 future, those three to five year olds will included, I
12 think, it's somewhere over 100, 150 maybe, 125, 150 kids
13 age three to five. So there will be a new category there.

14 And all of -- our effort in the biomonitoring lab
15 is to apply -- is to -- any place we have a subset to
16 include those kids, because as you mentioned, quite often,
17 the exposure, the concentrations, and certainly the dose,
18 if we do some kind of extrapolation to try to compare to
19 dose is quite a bit higher in children.

20 So I think that data -- that data is coming. I
21 just don't know which two-year survey cycle it will first
22 be available in, but we started measuring that in NHANES
23 13-14.

24 CHAIRPERSON BRADMAN: All right. Okay. How
25 about one more question -- two more, then we'll have

1 public comment, then we have a little time for discussion.

2 Dr. Cranor.

3 PANEL MEMBER CRANOR: A quick question about
4 perchlorate. I was reading an article recently that
5 suggested that perchlorate levels in -- generically in the
6 western states, and you mentioned the same thing, were
7 extraordinarily high in water systems. And I think they
8 mentioned Wyoming and places like that. Are you -- are
9 you -- have you done -- is it true, and are you doing
10 studies there? Because the suggestion was they were huge,
11 and compared to say California's safety standard for
12 perchlorate, it was like a million times greater. I mean,
13 just shockingly so, and I don't know if it's true, and if
14 you're sampling there.

15 DR. BLOUNT: So in the biomonitoring lab on
16 occasion we'll do water testing, but our focus is really
17 on human exposure through biomonitoring assays. We -- I
18 know that EPA, as part of the UCMR project, collected
19 nationally. California certainly has been tracking
20 perchlorate for some time. Water utilities are tracking
21 and there are -- there certainly is guidance around that,
22 depending on the State.

23 I -- with the State of Wyoming, I don't know
24 what -- if they have any perchlorate regulatory guidance
25 for utility -- for public utilities.

1 PANEL MEMBER CRANOR: The suggestion was no on
2 the -- no MCLs, no national MCLs.

3 DR. BLOUNT: And there's no national MCL. There
4 are national health advisory levels. And I would think
5 that a public utility at least would look at, you know, if
6 they're putting out into the distribution something that's
7 over the 10-day health advisory level, that they would
8 take some kind of action.

9 There are ways to mitigate that, selective
10 resins, that can be used that are somewhat expensive, but
11 there are ways to clean that water up.

12 PANEL MEMBER CRANOR: The suggestion was that
13 there are really millions of people exposed. Now, how
14 much -- what's showing up in their bodies, I don't know.

15 DR. BLOUNT: As far as NHANES, we did do some tap
16 water sampling, and put that together with biomonitoring
17 levels, and the tap water perchlorate we found was just
18 low part per billion. And when we put that as a
19 regression model, and compared it with other foodborne
20 perchlorate exposure pathways, the foodborne variables
21 were much more significant in predicting your elevated
22 urinary perchlorate.

23 So dairy products, green leafy vegetables were
24 more of a significant source, in general. But they're
25 certainly -- you know, this situation you're describing

1 would be a huge exposure.

2 PANEL MEMBER CRANOR: Hot spots of some sort.

3 CHAIRPERSON BRADMAN: Dr. Quintana.

4 PANEL MEMBER QUINTANA: Hi. Thank you for that
5 presentation. Just following up on what Dr. Bradman said
6 about sampling in younger age groups, that's especially
7 significant talking about tobacco toxicants, because
8 they're likely to get more exposure to the residue of
9 smoke -- thirdhand smoke in dust. I know house dust is a
10 major route of exposure to lead and flame retardants in
11 some studies.

12 But also, it made me think when you looked at --
13 again, showing that perchlorate slide, if you're sampling
14 younger children, you have additional pathways of
15 exposure, but you also have potentially higher dose
16 showing up or higher levels showing up in the urine,
17 because of a higher intake per kilogram of body weight.

18 And it made me wonder, looking at your NHANES
19 tables, would you have to start normalizing per kilogram
20 of kid, or something in a way, to look at this -- this
21 ages where they're growing and so rapidly. And those
22 stratifications might be changing quite rapidly. And I'm
23 just curious if you had any discussions about that?

24 DR. BLOUNT: We grapple with that a little bit.
25 I co-authored a paper with Sean Hays and Lesa Aylward

1 looking at biomarker excretion rates, and we went back and
2 forth with do we divide by body weight as part of that
3 presentation or not? And ended up presenting it both
4 ways.

5 So, but it's definitely a factor and comes back
6 to, you know, do we -- I guess, from a toxicological
7 standpoint, there's certainly a compelling argument to be
8 made that you really want to know how much toxicant per
9 kilogram of target tissue. And so I don't know there
10 might be something where you eventually move toward that.
11 But for the time being, we're just presenting our
12 excretion data both ways, and, of course, creatinine
13 scales with, you know, that lean body mass, and body size,
14 as well, so it adjusts somewhat as well, but ongoing
15 research in that area.

16 CHAIRPERSON BRADMAN: Okay. Thank you for those
17 questions. And again, we will have some more time for
18 discussion related to this, but we have at least two
19 requests for public comments. And the one by email, and
20 one in person. And we'll start first with the in-person
21 Nancy Buermeyer from the Breast Cancer Fund.

22 MS. BUERMEYER: Thank you, Dr. Bradman. Nancy
23 Buermeyer of the Breast Cancer Fund. Good to see you
24 again, Dr. Blount. And thank you for that really
25 interesting presentation. And I ended up with three

1 questions about three completely different things. So
2 I'll start with perchlorate. Really fascinating
3 information.

4 I have to say I was really shocked to find out
5 that perchlorate is intentionally added to food packaging,
6 and is approved by the FDA to do so. The Breast Cancer
7 Fund has signed on to a food additives petition to try to
8 get the FDA to decertify the use of perchlorate in food
9 packaging. It's used as an anti-static compound in
10 plastic packaging for dry products like flour and the
11 like.

12 So you said that food was one of the major
13 sources. And I'm assuming that's not what you're thinking
14 about. But I wanted to see if it's something that you
15 had -- was aware of or had thought about at all?

16 So that's one question, and I'll let you finish
17 that and I'll come back.

18 DR. BLOUNT: So just very briefly, I -- that's
19 definitely worth following up, and getting an idea of what
20 food products that's used on, and plugging that into our
21 regression modeling of urinary perchlorate, and the
22 24-hour dietary recall to see if use of those products is
23 associated with increased exposures. Our model so far,
24 dry good, we've not seen an association with cereal
25 products, for example, but that's really broad.

1 I guess one of the challenges, if there's staples
2 like -- staple foods like flour, how do we assess that
3 with that very specific dietary recall question, where
4 it's more finished foods, but definitely something to look
5 into. Thanks for the heads up.

6 MS. BUERMEYER: Yeah, I mean, we were hoping to
7 get some migration studies out of the FDA as well to see
8 what they think is migrating into the food.

9 So moving to the tobacco products, you had really
10 clear bar graphs that showed the difference between
11 combustion and smokeless or non-combustion products, does
12 that drop out, the e-cigarettes, which sort of feels like
13 it's neither or?

14 And so e-cigarettes have been a big issue here in
15 California. We've just passed a law to try to regulate
16 them more like the rest of tobacco products. Laws to try
17 to prevent kids under 18 from buying them. So it's a big
18 issue here, and it's not clear to me how developed the
19 science is around some of this exposure stuff.

20 DR. BLOUNT: So our goal is to try to
21 characterize the exposure patterns related to it, so that
22 we can better study the potential harm caused by that, and
23 connect exposure with health effects. E-cigarettes are a
24 moving target right now. There are multiple generations,
25 very different kinds of products, you know, ranging from

1 these disposable little cigalites to fourth generation,
2 dual coil, adjustable voltage, you know, very -- you know,
3 and the resulting chemistry varies quite dramatically.

4 So definitely a moving target. We're trying to
5 cover the different classes of compounds that could be of
6 relevance, and also trying to cover the differences in
7 potential harm caused directly by uses of combustion --
8 combusted product versus non-combusted product, such as
9 e-cigarettes, and to provide data to policymakers about
10 that, both with -- from an individual standpoint and a
11 population standpoint.

12 I think one of the potential concerns there, even
13 if an e-cigarette is a less harmful way to deliver
14 nicotine than a cigarette, what's the overall population
15 harm, if a whole generation of young people becomes
16 addicted to nicotine from using that product?

17 And so we're trying to understand the exposure
18 and track what is happening, for example, as part of
19 NHANES, where for NHANES 13-14 we asked about e-cigarette
20 use for the first time in NHANES, and connect -- and can
21 connect that with serum cotinine, urinary nicotine
22 metabolites.

23 MS. BUERMEYER: Just when you thought you had
24 tobacco figured out, the companies gave you something else
25 to work on.

1 (Laughter.)

2 MS. BUERMEYER: And my last question is really
3 simple. In looking at the three- to five-year old
4 children, are you looking at both urine and blood or just
5 urine?

6 DR. BLOUNT: The three- to five-year olds have
7 always been part of the serum cotinine analysis. I think
8 all down to very young children, we have serum cotinine.
9 The comments I made are just for urine with the
10 environmental subsamples, and that's where we've expanded
11 into collecting urine from these kids for environmental
12 exposure questions.

13 So it's -- there are serum samples available for
14 young children. But as you can imagine, those are very
15 valuable and very difficult to get approval to measure
16 serum toxicants in those kids. Cotinine is one of the
17 analytes that is approved for that though.

18 MS. BUERMEYER: Than you, and thanks for all the
19 great work that you do. Appreciate it.

20 DR. BLOUNT: Thanks.

21 CHAIRPERSON BRADMAN: I think we have now a
22 public comment by email and Amy is going to read that.

23 MS. DUNN: This comment comes from Jessica Frank
24 of the EPA National Exposure Research Laboratory in
25 Research Triangle Park.

1 She says, "You mentioned that poor diet
2 contributes to health outcome for perchlorate exposure,
3 but the foods you showed aren't typically associated with
4 poor diet. Can you expand? Were you simply referring to
5 a reduced iodide intake as poor diet?"

6 DR. BLOUNT: Point well taken. I was speaking
7 about low iodide intake, and low iodine intake, certainly
8 green leafy vegetables, many dairy products are part of a
9 healthy diet. The -- it is important to understand the
10 need to have adequate iodine intake, especially when the
11 prevailing public health message for many people, and
12 rightly so, is to reduce your salt intake, while the
13 public health effort to make sure everybody gets enough
14 iodine is to put iodine in salt.

15 And so yeah to clarify that comment, it's
16 important for people to be purposeful about getting enough
17 iodine in their diet. And for those who have lower iodine
18 levels, we see this interaction with environmental
19 exposure and tobacco smoke exposure to be associated with
20 lower thyroid hormone levels.

21 CHAIRPERSON BRADMAN: Yeah. We actually have --
22 if there's no more public comments, we actually have about
23 10 minutes for so, or a little bit more, for Panel
24 discussion around the presentation and related topics.

25 So, Dr. Schwarzman.

1 PANEL MEMBER SCHWARZMAN: Just taking on that
2 point about the perchlorate. It reminded of a question
3 that I had and forgot to ask about. Did you look
4 specifically at pregnant women just because I understand
5 the demand -- increased demand on the thyroid during
6 pregnancy? In addition to exposure to perchlorate as a
7 competitive inhibitor for iodide uptake tends to produce
8 more low thyroid hormone levels, which, of course, is much
9 more significant during pregnancy than for adults.

10 DR. BLOUNT: So in our study, with NHANES, as you
11 know, NHANES is cross-sectional, and is great for looking
12 at where the population is at this particular time.
13 NHANES does include some pregnant women, typically in our
14 one-third environmental subsample, around 100, 125 or so,
15 and at different places in their pregnancy.

16 We and others have looked at pregnant women as
17 part of these data sets. And, you know, pooling that
18 across multiple years, we've not found an association in
19 pregnant women. And I would -- it doesn't mean that it's
20 not there. Certainly it's a time of great thyroid flux,
21 and there's -- because of that change in -- as a normal
22 part -- the change in thyroid hormone levels is a normal
23 part of pregnancy, it's harder to see something that is
24 causing a more modest change.

25 I think that the CATS study with John Lazarus and

1 Elizabeth Pearce has found some interesting things around
2 perchlorate exposure and pregnancy. And then several
3 studies have looked at thyroid function in pregnancy and
4 neurocognitive development of subsequent children in
5 decrements. So there certainly are some papers indicating
6 that there are some things to pay attention to there.

7 I would also add the lactating -- or lactation in
8 infants as a -- also a vulnerable life stage, where at
9 least in utero, the baby is also protected somewhat by
10 mom's thyroid. After birth, there's very little thyroid
11 stores of T4. And so especially if breast milk or --
12 well, if the infant source of nutrition has perchlorate
13 and low iodine levels, that it's a population to be
14 careful about.

15 PANEL MEMBER SCHWARZMAN: Just to clarify, when
16 you said you didn't see an association between pregnancy
17 and level, did you mean perchlorate levels or --

18 DR. BLOUNT: Yeah, perchlorate levels.

19 PANEL MEMBER SCHWARZMAN: Yeah. Okay. So maybe
20 no disparate exposure level, but a disparate impact of any
21 exposure that there is?

22 DR. BLOUNT: Oh, and just clarify, yes, we did
23 not see -- pregnant women had perchlorate exposures
24 similar to other women of -- you know, age-matched women,
25 and secondly, in perchlorate women -- or, sorry, in

1 pregnant women in particular, we did not see a
2 relationship between perchlorate exposure and thyroid
3 hormone levels.

4 CHAIRPERSON BRADMAN: So we have time now -- more
5 time now for Panel discussion. I know I have a comment.
6 It perhaps derives from your presentation, although it's
7 not specifically about it, but I think it's relevant to
8 California and the biomonitoring program. You mentioned
9 in here that you made some comparisons between possible
10 exposures related to marijuana use, and how some of those
11 chemicals overlap with tobacco smoke.

12 And, you know, given that a few states have
13 legalized recreational use of marijuana, and it's probably
14 likely to happen in California in the next year or so, I
15 understand that the federal government is not in a
16 position to do biomonitoring related to that. But I have
17 some concerns about exposures to those materials,
18 especially for kids and young kids, and also the marketing
19 have, you know, edible forms, which is going to be, I
20 think, potentially a kind of new Joe Camel, in terms of
21 attracting kids to candy and brownies and stuff like that,
22 at a younger and younger age.

23 And I'm just wondering, if there's been any
24 scientific thought about that at CDC, and it's also maybe
25 something we should consider here, given that's

1 potentially emerging and increasing in the State.

2 DR. BLOUNT: Certainly, for us at CDC, we -- we
3 see our -- part of our public health role as engaging with
4 the states, and States Department -- State departments of
5 health and being of service. We've had many queries,
6 especially from Colorado, questions related to active use
7 by lactating women, active use in the presence of
8 children, where the law states you cannot smoke in public.
9 If you live in an apartment, you know, where else do you
10 have? You're smoking inside in front of your children.

11 And there are increased rates of bronchiolitis,
12 and other respiratory conditions in the children, as a
13 result. And there's very little guidance here for a
14 lactating woman who has stopped smoking marijuana and how
15 long does she pump and dump before many of these
16 combustion products are cleared from the breast milk, and
17 the psychoactive components as well.

18 So we're trying to respond proactively in those
19 kinds of ways, as well as just trying to quantify the
20 exposure. So looking at secondhand exposure questions,
21 for example, where there's a perception this is a natural
22 product. It's not bad for me. So in some ways, it's
23 renormalizing smoking back in public spaces.

24 CHAIRPERSON BRADMAN: Exactly. And I know I've
25 actually been approached individually by people in the

1 industry in Colorado about pesticide residues in
2 marijuana. And right now, there's no standard for
3 materials being used. And quite, you know, a mixture of
4 materials are being used. Potentially, you know, right
5 now, there likely, if there's any regulatory framework,
6 they're going to adopt the tobacco framework for
7 pesticides on tobacco. But right now, it's still kind of
8 the wild west.

9 DR. BLOUNT: Yeah, definitely.

10 CHAIRPERSON BRADMAN: Dr. Schwarzman.

11 PANEL MEMBER SCHWARZMAN: I have a related
12 question about -- tell me if this is a little too far out,
13 but the potential use of biomarkers of exposure to
14 marijuana in the application of like field sobriety
15 testing, so where we have very accurate blood alcohol
16 level testing, and we know that marijuana impairs driving,
17 but I don't -- you know from a public health perspective,
18 as we look at increasing legalization of marijuana, I'm
19 afraid we're just going to see a lot impaired driving.
20 And there's a problem in making that assessment in the
21 field, because we don't have a breathalyzer, and in making
22 any sort of conviction, because unless there's really
23 sophisticated field sobriety testing, you can't establish
24 the level of impairment very easily.

25 So do you have any thoughts, or tell me if this

1 is just outside, what you've looked at, but for the use of
2 these biomarkers in that kind of application?

3 DR. BLOUNT: It is completely outside the scope
4 of what I do. Having said that, by understanding the
5 half-lives of the biomarkers, and also understanding --
6 you know, differentiating between direct inhibition
7 or impairment and past exposure, I think, is very
8 important here.

9 The National Transportation Safety Board and
10 others in states are actively grappling with this, how to
11 do this, how to establish this, you know, in a legally
12 effective way.

13 And I think analytical measurements, and
14 therefore biomarkers will be part of this. I'm not sure
15 how that will be implemented, what it will look like,
16 because it's really far afield from CDC's mandate around
17 this, but I know people are looking at that very important
18 question.

19 MS. DUNN: Asa.

20 CHAIRPERSON BRADMAN: Amy.

21 MS. DUNN: We have another comment from Jessica
22 Frank. I don't know if it's too late?

23 CHAIRPERSON BRADMAN: Okay. I think we have
24 time.

25 MS. HOOVER: I think we should end.

1 Okay.

2 CHAIRPERSON BRADMAN: We have about one minute.
3 Are there any other questions from the Panel? I think
4 we'll prioritize the Panel comments right now, and then
5 we're going to have an announcement and a break for lunch.

6 Dr. Fiehn.

7 PANEL MEMBER FIEHN: Thank you again for your
8 very wonderful presentation actually. I was enthused
9 about the progress in analytical chemistry that has led
10 to, you know, much lower prices, and much higher
11 throughputs, and much better sensitivity. But even with
12 very good triple quadrupoles or Q-Traps like that you have
13 outlined here, you still need 200 microliters of plasma
14 just to measure cotinine.

15 You also said it's nice, and I think might be in
16 your bonus slides that we didn't show, that it's nice to
17 have as many targets as possible. So that's also like the
18 speed of mass spectrometers can do this.

19 You know, to the best of your estimate, how many
20 of those panels can we combine? You know, and how could
21 then untargeted exposome analysis help, in addition for
22 higher concentrations? And that relates also a little bit
23 to the question that we had lined up with the iodide
24 exposure, because, you know, obviously nutritional
25 exposure is a huge impact on overall health outcomes. And

1 it's a huge question in many epidemiological studies,
2 where right now people ask food frequency questionnaires,
3 and they're just miserable, based on huge evidence.

4 So it would be much nicer to say, well, we go for
5 very low environmental pesticide, and so on, exposures
6 with targeted methods. And then we have very abundant --
7 or relatively abundant compounds -- and I thought all this
8 cotinine would belong to those -- you know, where we can
9 also go for less sensitive but broader methods. So I'd
10 like a little bit to gauge your kind of opinion here.

11 DR. BLOUNT: Yeah. So I think that it's an
12 important question. And as there are more chemometric
13 approaches, or untargeted approaches. It's an important
14 topic to be aware of. I would say an effective analytical
15 method depends on the intended purpose of the data.

16 If you need to have an unambiguous quantitative
17 trace level measure of something of defined accuracy,
18 specificity, and precision, then a targeted analysis is
19 the only way to get there, because there are so many
20 different components in a biological specimen. And, you
21 know, for the analytical chemist and biomonitoring
22 measurement people in the room, we can tell you, you know,
23 this could work in 90 percent of the urines, but in 10
24 percent I get this strange ion suppression phenomenon, and
25 unless I have a stable isotope-labeled internal standard,

1 I can't adjust for that in my quantitation.

2 So there are factors such as that, that if one
3 takes a chemometric approach, and then tries to say I can
4 use this data also in a regulatory manner and say I'm
5 confident in the accuracy and precision of this
6 quantitation, I think you're -- there are some questions
7 there that one needs to be careful about with the
8 untargeted analyses.

9 Having said that, as I said in my opening
10 comments, untargeted analysis is a great discovery tool.
11 It's a great tool from a broad perspective around the
12 exposome and broad biological processes. But if you want
13 to drill down and quantify secondhand smoke exposure by
14 picking a peak out of a untargeted analysis chromatogram,
15 one needs to be careful about interpreting that data at
16 ultra trace levels.

17 CHAIRPERSON BRADMAN: I'm going to just interrupt
18 here, because we're at our break point for lunch, and we
19 need to make an announcement. We can continue some of the
20 discussion during lunch within the confines of the
21 Bagley-Keene announcement that we'll hear, and then we'll
22 be able to reconvene this afternoon.

23 So we'll have the announcement and then adjourn
24 for lunch.

25 STAFF COUNSEL KAMMERER: Hi. Fran Kammerer,

1 staff counsel for OEHHA, just reminding you to refrain
2 from discussing Panel matters or this meeting matters when
3 you're away from the public forum here.

4 Thank you.

5 MS. HOOVER: Very concisely done.

6 And go ahead, and I just want to --

7 CHAIRPERSON BRADMAN: Well, I was just going to
8 reiterate the time frame for lunch.

9 MS. HOOVER: Go ahead.

10 CHAIRPERSON BRADMAN: Okay. So we have a break
11 for lunch now. We have a tight schedule in the afternoon,
12 so we'd like everyone to be back here by 1:25 p.m. So we
13 have about an hour and 10. If you have a smartphone, if
14 you want to be really smart, if everyone can set their
15 timers to go off at 1: --20

16 (Laughter.)

17 CHAIRPERSON BRADMAN: -- so you'll know when to
18 start walking here. Okay.

19 MS. HOOVER: And also, just so everyone knows,
20 for the quickest dining option, you should use the
21 cafeteria. That's going to be your best bet.

22 Thank you. See you soon.

23 MS. CHRISTENSEN: For our visitors, visitors who
24 are not from this campus, you have a badge, the doors in
25 the cafeteria will let you in and out only for the

1 lunchtime hour. Okay. So please be sure to be back here
2 on time, otherwise you'll be trapped outside.

3 The other thing is our cafeteria closes at 2:00
4 p.m. So, please, if you want to, drinks or snacks, pick
5 them up now.

6 (Off record: 12:18 p.m.)

7 (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: 1:28 p.m.)

3 CHAIRPERSON BRADMAN: Okay. So I'm going to call
4 the meeting back to order and welcome everybody. And
5 we're on schedule, which is good.6 So this afternoon, we'll be discussing topics
7 related to biomonitoring pesticides in California. The
8 afternoon session will include three presentations with
9 time for questions for each -- after each presentation.
10 We'll also have a brief minute break following the second
11 presentation and question period.12 After the break, the session will continue with
13 the final presentation, public comment, and time for
14 in-depth discussion on topics presented.15 And the one thing I really want to emphasize too,
16 that this is really an important topic for California.
17 California is the biggest agricultural State in the
18 country, dollar-wise. We produce a lot of fruits and
19 vegetables. Fruits and vegetables are also really
20 important for better public health in California and the
21 nation as a whole.22 And tools for growing that food include
23 pesticides. And so I think this is a really important
24 discussion both to consider how to look at exposures
25 related to pesticides but also when we consider what the

1 health results are, we also have to consider what the
2 benefits are of some of the foods that are being produced.

3 So we do have some specific goals for this
4 afternoon's session. One, we want to discuss general
5 considerations for biomonitoring pesticides. That will
6 partly be informed by my presentation, and also we're
7 going to hear from Dr. Paul English about his work looking
8 at pesticide use near schools.

9 And then importantly, we want input on strategies
10 for future program studies, both in terms of new sample
11 collection, and also possible classes of pesticides to
12 test for as target analytes. In particular, OEHHA is
13 looking at three possible pesticide classes that should be
14 considered as potentially designated chemicals. And down
15 the road, we'll also consider whether we'll want to
16 prioritize them.

17 But just importantly, this is a really important
18 issue for the State of California. And I think there's a
19 place here to really understand exposures. And as we
20 understand them, perhaps move forward on ways to protect
21 public health, but also protect agriculture.

22 So I want to introduce Dr. Paul English. He's a
23 Senior Branch Advisor for the Environmental Health
24 Investigations Branch at CDPH. His work is focused on the
25 public health impacts of climate change, air pollution,

1 pesticides and other environmental health issues,
2 including work at the U.S./Mexico border, and also
3 reproductive outcomes.

4 Dr. English is the Principal Investigator for
5 California Environmental Health Tracking Program, which
6 takes a community-based approach to develop surveillance
7 systems related to environmental health issues. He's
8 dedicated to involving the community and responding to
9 their needs and concerns through application of many
10 disciplines, including environmental epidemiology,
11 geographic information systems, and health communication.
12 So, again, Dr. English will be talking on their report,
13 Agricultural Pesticide Mapping and Proximity to Public
14 Schools.

15 So thank you, Paul, for making the time to
16 present this information. And I think we all look forward
17 to hearing about it.

18 (Thereupon an overhead presentation was
19 Presented as follows.)

20 DR. ENGLISH: Okay. Can you hear my okay?
21 I started to unbutton my shirt.

22 (Laughter.)

23 DR. ENGLISH: Okay. Can everybody hear me?

24 Yeah. Okay. Thank you very much, Asa, for that
25 introduction, and thanks to the Panel for inviting me to

1 talk today. So -- let's see, so as Asa was saying, I'm
2 going to talk a little bit about a report that my program,
3 the California Environmental Health Tracking Program put
4 together a couple of years ago.

5 --o0o--

6 DR. ENGLISH: And so what I'm going to talk about
7 is that report a bit. And then I want to show you a tool
8 that we've developed in the program to visualize and
9 display the data from the California Department of
10 Pesticide Regulation from their pesticide use reports,
11 which may be useful to this program or others interested
12 in pesticide issues.

13 And then I'm just going to make one -- one slide,
14 one suggestion on how to use some of these mapping tools
15 to do some sampling for biomonitoring that maybe you'll
16 have some ideas about.

17 So next slide, please.

18 MS. CHRISTENSEN: We're having a technical issue.

19 DR. ENGLISH: Okay. While they're dealing with
20 that, I'll just keep going.

21 So next slide, please.

22 --o0o--

23 DR. ENGLISH: So the -- first, I just want to
24 tell you a little bit about the California Environmental
25 Health Tracking Program. This is a program we've had here

1 in the Health Department, but it's a -- actually a
2 partnership between the Department of Public Health and
3 the Public Health Institute in Oakland.

4 And we've been funded. This is a program funded
5 by the CDC. We have some other funding for our Program
6 also. So the mission of the Program then is to provide
7 really usable, understandable information on environmental
8 health hazards, and health outcomes that are related to
9 the environment to stakeholders. And the stakeholders can
10 range from researchers all the way to the public.

11 Back to the previous slide. Yeah.

12 And so what we -- as part of our mission, I
13 mentioned, you know, improving the availability and
14 usability of this data. We also want to build stakeholder
15 capacity, and promote community engagement with the use of
16 these data, and inform public health actions in
17 California, including research policies and practices.

18 Next slide.

19 --o0o--

20 DR. ENGLISH: So let me talk about the pesticides
21 and school study. So this was a descriptive study
22 released in 2014. And the goal of the study was to assess
23 the poundage and types of pesticides that are applied near
24 schools in 2010. This was the year we had data.

25 And now for near schools, we chose a quarter of a

1 mile from the school boundary. And this distance was a
2 little bit arbitrary, but it was chosen, first, as a
3 reasonable distance that pesticide drift could occur. And
4 secondly, this is a distance that's been used a lot in
5 regulations on the books.

6 We chose 15 -- the top 15 counties in California
7 by their total agricultural pesticide use, and we used
8 four different sources of data for the project. I
9 mentioned the pesticide use reports from DPR, Department
10 of Pesticide Regulation. We also used some data from the
11 Department of Education on schools.

12 And then this one is a key element. It was the
13 very first time this data has ever been obtained, which
14 made this study very special. It was actually the
15 borders -- the electronic borders of the actual fields
16 where pesticides are applied. And I'll mention in a
17 minute why this was important. And we were able to get
18 those from the individual agricultural commissioners.

19 And then there was also land survey use data that
20 we also used from the Department of Water Resources. So
21 this only -- this study only included agricultural
22 pesticide use. It did not look at structural pesticide
23 use, you know, for like termite sprayings, and also not
24 data that is used when pesticides are applied on school
25 properties. And I'll mention that again why not we didn't

1 use that.

2 Okay. Next.

3 --o0o--

4 DR. ENGLISH: You guys -- probably everybody
5 knows this issue, but I'll just reiterate it why we were
6 interested in looking at children. They are mostly --
7 they're more susceptible to exposure than adults, because
8 they eat and drink more relative to their body weight than
9 adults. They -- of course, they play outdoors. They
10 engage in hand-to-mouth behavior. And when you look at
11 health outcomes such as neurological and physiological
12 development, whether you're looking at it prenatally and
13 postnatally, you know, this is a very precisely
14 choreographed sequence of events.

15 And this is why we sometimes say there's very
16 important windows of vulnerability that we want to look at
17 exposures that might impact growth, development,
18 neurodevelopment, reproductive outcomes. And then, of
19 course, kids spend a substantial time of their life on
20 school grounds.

21 Next slide.

22 --o0o--

23 DR. ENGLISH: So here's the question that we got
24 when this report came out, you know, well, this is really
25 no good, because here's looking -- you didn't measure --

1 you didn't measure human issues in these kids. You don't
2 know what's actually -- you didn't do any environmental
3 sampling, so, you know, how -- you know, why should we
4 even be concerned about the results of this.

5 Well, it's true that proximity doesn't
6 necessarily totally equal exposure, but I would say it
7 increases the risk of exposure. And we continue to have
8 studies coming out showing that, first of all, things are
9 drifting. Drift is acknowledged as a phenomenon that
10 happens. For example, methyl bromide has been detected up
11 to 70 meters away from an application site.

12 We know work that's done by NIOSH that a large
13 percentage of pesticide illness, almost half, is
14 associated with fumigant drift. And then there's been
15 work that's come out from CHAMACOS. They had been looking
16 at proximity to fields, and seeing associations with
17 higher levels of metabolites in children.

18 And then just -- you may have seen just recently
19 a couple days ago, they have a new report out. And I'm
20 sure Asa would be glad to talk more about this, if you
21 have questions that they're seeing, I believe, it was one
22 kilometer away from residences of children in the Monterey
23 Valley in the Salinas Valley area, that they were seeing
24 deficits of IQ up to two points of IQ associated with
25 applications of primarily OPs.

1 So again, that adds more weight of evidence to
2 looking at this.

3 Next.

4 --o0o--

5 DR. ENGLISH: Okay. So I'm going to go over
6 briefly the basic methods for what we did. I'm going to
7 go through each one of these in a little bit more detail.
8 First, we had select counties, determined school
9 boundaries, what pesticide categories were we going to
10 look at, and then we had to link the school boundaries to
11 pesticide data. And for each category then, we calculated
12 the number of pounds used near schools, and then we did
13 this other demographic analysis using the data from the
14 Department of Education where we obtained data on
15 race/ethnicity for the children attending there, and then
16 also, we had income proxy. And this was whether they --
17 the children participated in federal free-lunch programs,
18 so we used that data also.

19 Okay. Next.

20 --o0o--

21 DR. ENGLISH: So the first step on selecting
22 counties. I think Asa in his introductory comments was
23 talking about how we use a lot of pesticides here. We
24 grow a lot of the fruits and vegetables. There is a
25 health benefit, of course, of eating fresh fruits and

1 vegetables. California is about -- supplying about a
2 quarter of -- well, California uses about a quarter of
3 pesti -- the country's pesticides.

4 And when we selected these counties, these 15 top
5 counties, it was about 85 percent of all the pesticide use
6 in California. And even these 15 counties account for
7 almost 20 percent of the entire country's pesticide use.
8 So as it was mentioned before, this is a significant
9 amount of pesticides.

10 And you can see in 2010, the poundage -- the top
11 27 million pounds in Fresno -- probably Fresno is still
12 the top county in terms of pesticide use.

13 Next slide.

14 --o0o--

15 DR. ENGLISH: Now, this point is really
16 important. This is the time we've most accurately found
17 the locations of schools. So in past, a lot of times when
18 people are doing these types of geographic analyses, they
19 would get the address of a school, put it in to a -- you
20 know, into software, and find the latitude and longitude
21 or geocode that point in space.

22 Well, oftentimes if you just use this address, as
23 we found when we started looking into the data visually,
24 you know, there could be errors up to a mile away, because
25 they have the office address or some administrative

1 address, and it wouldn't really relate to where the
2 schools are.

3 So we put together a very highly accurate
4 boundary file where we went in and, as you can see from
5 the slide, visually look -- found the actual boundaries of
6 the schools, and then digitally mapped these using aerial
7 photography, Google Maps and to verify that we were
8 actually getting the locations of the actual boundaries.

9 And just as an aside, there's now going to be
10 available very soon a complete set for the entire State,
11 if people are interested in that, because there's a group
12 called GreenInfo that did some work for Stanford, I
13 believe, and they're going to -- when you combine their
14 work with our work, we're going to have a complete set of
15 school boundaries. So that's pretty exciting.

16 Okay. Next.

17 --o0o--

18 DR. ENGLISH: So these were the pesticide
19 categories that we selected. There were six groups
20 selected for public health relevancy and categorized by
21 known health effects and regulatory status: carcinogens,
22 development and reproductive toxins, cholinesterase
23 inhibitors, toxic air contaminants, fumigants, and then
24 prior pesticides that were selected -- these were on a
25 list that -- and maybe you guys are talking about this

1 today. There's a list that DPR has. They're priority
2 pesticides for monitoring and assessment. So we looked at
3 those -- at those compounds also.

4 And you can look in the report if you want to get
5 a little bit more detail on how those categories were
6 selected, and how pesticides were put in these categories.
7 But primarily, they're, you know, based on EPA
8 classifications, the Prop 65 classifications, or other
9 lists from DPR, hazardous air pollutant lists. So, you
10 know -- or this list from CDPR on priority pesticides.

11 Next.

12 --o0o--

13 DR. ENGLISH: Okay. So I'm going to go just a
14 little bit in, but not a lot of detail on how we actually
15 did the linkage. It's fairly complex how to link -- how
16 to link the pesticide applications to this distance to the
17 school boundaries.

18 And what I want to show you here is -- I don't
19 know, is there a pointer available on the thing, or it's
20 not working?

21 MS. CHRISTENSEN: That pointer, you push the
22 green button.

23 DR. ENGLISH: The green button.

24 So if you look here, the data that's normally
25 available from the pesticide use report is called a

1 section. It's based on this thing called a Public Land
2 Survey, which probably, you know, when the wagon trains
3 came out, they probably established this originally.

4 But the lowest level of geographic detail
5 normally is one square mile. This is called a section
6 right here. And just to show you the better data that we
7 got, this is an example of field. We can call it field
8 number 103.

9 And this is the boundary. So we actually got
10 these boundaries from this 15 county agricultural
11 commissioner offices. So we were able to link then the
12 school boundary -- a quarter mile from the school
13 boundary, which, let's say, we were buffering it with this
14 buffer right here, and let's say this was the school. And
15 so we wanted to capture all this pesticide use within this
16 boundary. So we were able to use this linkage for 80
17 percent of the applications. This was the best linkage.

18 And this was basically used -- a distance -- not
19 a distance, an area-weighted approach. And so, for
20 example, if there was 100 pounds of a pesticide applied,
21 you know, to walnuts in this field, let's say it was a
22 walnut grove, and then we can calculate spatially that 55
23 percent of that field lies within a quarter mile of that
24 school, then we would estimate, well, there was 55 pounds
25 in that boundary area. And so we would just redo this

1 over and over again for all the compounds within the
2 boundary.

3 Then for about 20 percent of the applications, we
4 used another method that's been published by Beate Ritz
5 from UCLA, she's used this method a lot, in a lot of her
6 pesticide work. And it's using this land use data the
7 Department of Water Resources collects. I won't go into
8 detail, but they do these surveys every so years they
9 go -- every six or so years they do each county. And they
10 go out, and they're actually doing a survey of what crops
11 are grown in a parcel. And then we can -- because we have
12 crop data in PUR, we can go back and find out what
13 pesticide was applied in that area.

14 And then the final -- the crudest data for this
15 linkage, which was only for one -- less than one percent
16 of the applications, we went back to just saying --
17 looking at the information on what's applied in this one
18 square mile area. Although, we don't know for sure where
19 in that one square mile area that was applied. So that's
20 what has the most error is less than one percent of the
21 applications.

22 And you can read all the details about that in
23 the report, if you're interested.

24 Next.

25 --o0o--

1 DR. ENGLISH: Okay. Let's already go to the
2 findings. So we found that 36 percent of schools, so this
3 was 899 schools, they had pesticide use -- these
4 pesticides of public health concern applied nearby. A
5 small percentage, about five percent, had large amounts
6 ranging up to 28,000 pounds applied in this year. And we
7 found Hispanic children were 91 percent more likely than
8 white children to attend schools in the highest quartile
9 of use.

10 And there was a lot of varying amounts of
11 pesticides applied near school by county. And I could
12 mention Monterey and Ventura as two of the counties that
13 really came up a lot. And you can see all the county
14 rankings in the report.

15 Next.

16 --o0o--

17 DR. ENGLISH: So let's look at these compounds
18 for a minute. So these were the top 10 pesticides of
19 public health concern. The first thing to think about,
20 when you look at this list, is most of these compounds,
21 not all of them, but most of them are fumigants. So these
22 are going to be likely to be prone to drift.

23 The next thing you might notice about this is on
24 the chemical persistence, a lot of these have moderate to
25 high persistence. This is a fact from this report that's

1 really not getting enough attention, because, you know,
2 whenever we would go back to the agricultural
3 commissioners they would say, well, you know what, you
4 know, we just -- we don't apply it when the kids are
5 there. You know, right before they come, we apply it, but
6 they're not there. You know, or we'll do it on the
7 weekends.

8 Well, you know, the school is used during the
9 weekends. These are persistent these -- these are
10 compounds of, you know, up to 1,000 days of persistence.
11 So, you know, there's still the potential for exposure,
12 even if they're not applied during school hours. So, of
13 note, you know, chloropicrin is the top compound applied
14 near public schools. So we're applying a compound that
15 was investigated originally as a poison gas in World War I
16 near schools where kids are. That's really cool.

17 (Laughter.)

18 DR. ENGLISH: Now, that's combined with methyl
19 bromide usually and Telone, which is the second one on the
20 least, 1,3-dichloropropene. A lot of these compounds have
21 carcinogenic properties. Methyl bromide is being phased
22 out. This was a compound that most of the world does not
23 use. It was banned by the Montreal Protocol. This
24 destroys the ozone layer, so -- but the United States had
25 got a special exemption to be continuing to use this

1 compound, because of economic reasons. This is something
2 that's primarily applied on strawberries.

3 It's, of note, also metam potassium, number 5,
4 which generates MITC, which is a highly, a highly irritant
5 gas. So that's one of the main concerns about that.

6 So I'm sure there's other people that have
7 knowledge of pesticide toxicology and can talk more about
8 some of these compounds than I can, but that was our list.

9 Next slide.

10 --o0o--

11 DR. ENGLISH: And this gives you just a visual
12 idea of some of these schools. This is actually the
13 location of a family that had been involved in a lawsuit
14 with U.S. EPA over civil rights violations, about
15 pesticide exposures around schools. This is Rio Mesa High
16 in Oxnard, one of the counties I talked to you about being
17 high on the list. And you can see chloropicrin, methyl
18 bromide. And that is methyl potassium -- No that is
19 Telone being -- no, that's metam potassium, sorry. Metam
20 potassium is three of the top compounds applied by the
21 school. Sixty-five percent Hispanic. So kids are out
22 here running around the tracks, exercising as these
23 compounds are being applied right by the school.

24 Next slide.

25 --o0o--

1 DR. ENGLISH: So these were the recommendations
2 from the report. We wanted to have a routine and
3 standardized collection, digitization, and reporting of
4 agricultural field locations. And after a complete
5 publicly accessible database of pesticides applied on
6 school properties, there was a bill, SB 1405, that was
7 actually focusing more on training of applicators on
8 school grounds, but does not address the applications
9 outside the school grounds.

10 I mentioned the school property boundaries issue.
11 And then also, we recommended that there would be ongoing
12 surveillance of the use of pesticides, not only near
13 schools but other sensitive land-use sites, such as day
14 care centers, or elderly rest homes, and the like.

15 Next.

16 --o0o--

17 DR. ENGLISH: After the report came out, Brian
18 Leahy, who is the Director of DPR, he published this
19 editorial in the Sacramento Bee that school kids must be
20 protected from pesticides. So there was a reaction from
21 the regulatory agency right away, and he proposed that
22 they're going to host, of which they did, a series of
23 public workshops throughout the State.

24 And I do think it was kind of interesting though
25 that he kind of criticizes that schools are sometimes

1 built on prime ag land, and, you know, what kind of logic
2 is that?

3 Well, I mean, anyone who knows anything about how
4 our schools get located, it's not like schools have an
5 awful lot of cash to -- where they can locate schools. So
6 that's kind of a contentious issue. And it's -- this -- I
7 think this report also has some implications for land-use
8 planning, and kind of, you know, what is this interface?
9 How are we dealing as a society with this interface
10 between ag uses and the expansion of communities out into
11 the agricultural zone?

12 Next.

13 --o0o--

14 DR. ENGLISH: So here's a couple slides from
15 the -- that was the reaction of communities after the
16 report came out. There were press conferences. These
17 individuals here are people that showed up at these series
18 of workshops. And so what was proposed is there will be
19 some plan to create standardized buffers around schools,
20 and/or are better notification to schools that these
21 compounds are going to be applied.

22 And so I'm hearing that later this summer we
23 should be seeing these proposed rules for comment.

24 Next.

25 --o0o--

1 DR. ENGLISH: So these were the things that the
2 stakeholders were advocating to the Department of
3 Pesticide Regulation, that they notice these three
4 compounds of concern, chlorpyrifos, chloropicrin, and
5 Telone.

6 They're saying again Latino children are being
7 disproportionately affected by pesticide use. We need
8 consistent statewide buffer zones, better notifications.
9 We need a modernized electronic database tracking
10 pesticide applications in fields, and we need to do --
11 continue with monitoring.

12 --o0o--

13 DR. ENGLISH: Okay. So that's what I wanted to
14 talk about the report. I'll be glad to answer questions
15 about that in minute, and I just have a couple more things
16 to tell you.

17 I wanted to tell you that we have a relaunch of
18 our agricultural pesticide mapping tool.

19 Next slide.

20 --o0o--

21 DR. ENGLISH: So what you're seeing right here,
22 this is all pesticides applied. Now, this is a map that
23 currently viewing at the township level. You're going to
24 be able to view this map at the county level, township,
25 which is a conglomeration of sections, and then at the one

1 area by zooming in on this map.

2 But what you're seeing here basically is where
3 agricultural use is in the State, you know, the San
4 Joaquin Valley, the Salinas Valley area, and pockets
5 around Ventura county, and then the Imperial Valley east
6 of San Diego.

7 Next slide.

8 --o0o--

9 DR. ENGLISH: So what you can do is we have
10 multiple years of data in this program. You can select a
11 geographic unit. You can see how you can summarize the
12 data in different ways. And then you can just type in --
13 you know, into the search box a compound that you're
14 interested in. It will pop up. Also, you can look at --
15 you know, I want to see chlorpyrifos applied at a certain
16 crop. You can type that crop name in too.

17 Next.

18 --o0o--

19 DR. ENGLISH: Is that it?

20 Okay. I guess my little interactive thing didn't
21 work, or maybe your program isn't working. But, oh, well,
22 you -- so you can go onto that cehtp.org and find that
23 tool. Ask us any questions, but, you know, we also
24 show -- we can show trends of pesticide use at a specific
25 area. It's been a real valuable tool for research. And

1 we've published several studies, some working with
2 Stanford University on the association between proximity
3 to pesticides and some birth defect outcomes, congenital
4 heart defects, and others.

5 My colleague Eric Roberts did a study looking at
6 this, and the risk of autism spectrum disorder in women
7 living near these fields during pregnancy. And, of
8 course, CHAMACOS and other researchers have used these
9 data, very valuable data.

10 And I just wanted to leave you with this final
11 slide on an idea of, you know, using this tool, using this
12 linkage ability to, if you wanted to take some type of
13 random or stratified random sample of where people are
14 exposed to pesticides in California. One thing that we do
15 have, we don't have a map -- we don't have the data of
16 everybody's address who lives in the State, but there is a
17 proxy that you can be -- that you can use that we have
18 individual level data on, on where populations are, and
19 that is the birth addresses.

20 So we have the address in vital statistics,
21 electronic address, of every woman that's given birth in
22 California, and whether it might be interesting to look at
23 that population, too.

24 So you could take a random sample or stratify it
25 in some way. You could geocode those addresses, and then

1 if there was a compound you were interested in looking at,
2 like say chlorpyrifos, you could say, well, I want a
3 selection of these women that live within a quarter mile
4 of where these applications are.

5 Another great thing about that data, it's
6 temporally -- it's temporally resolute. Also, you have
7 every day of application, so you can look at specific time
8 periods. For example, if you were interested during
9 gestation, you can see exactly what was applied during a
10 women's gestation.

11 Of course, you would have their birth date, the
12 birth date of the infant also. And then maybe you want to
13 take a sample then as a control population of individuals
14 that live more than some distance away. So this is just
15 one approach that has come to mind in our team on a way
16 maybe the Biomonitoring Program might want to think about
17 doing some sampling, or there could be other methods too,
18 other approaches.

19 So with that, I think I just have a slide -- one
20 more slide that just shows -- just wanted to
21 acknowledge --

22 --o0o--

23 DR. ENGLISH: -- there's my email address if you
24 want to ask questions, and then I just wanted to
25 acknowledge my team at the Tracking Program that helped

1 put this together.

2 So thank you very much and be glad to answer any
3 questions.

4 (Applause.)

5 CHAIRPERSON BRADMAN: So we have 10 minutes for
6 clarifying questions from the Panel, and then we'll have
7 another presentation, then there will be more
8 opportunities for discussion.

9 Dr. Bartell.

10 PANEL MEMBER BARTELL: Yes. This is a
11 fascinating presentation. I had a couple questions just
12 about the public use data, the web tool. I was wondering
13 how far back in time this goes, you know, what year you
14 have records going back to that actually have the
15 geographic resolution? And then also what the time lag is
16 between the use of the pesticide and it showing up in the
17 web tool?

18 DR. ENGLISH: Yeah. So your second question
19 first. It's still about a two-year lag before we get the
20 data. I think that's a real issue. I mean, I think with
21 the technology that we have today, you know, we should
22 really be having real-time reporting of this stuff. And
23 we can talk about that issue more about how that might
24 happen. You know, I think it's having the political will
25 to do this is one of it.

1 And then on your second question, I think the
2 tool only goes -- I'll have to double check, but I think
3 it only goes back to the data that we have in there going
4 back to 1999 right now.

5 But there is older data I've used. We've done
6 some work on data. I think the data is actually in pretty
7 good shape going back to 1980, and there's even previous
8 data. But the older data, they only focused on restricted
9 materials -- restricted use pesticide applications.

10 So I believe it was probably when we started
11 looking at it that you started getting all the compounds
12 in the database, so that's one definition.

13 CHAIRPERSON BRADMAN: I think it was 1990 when
14 they went to --

15 DR. ENGLISH: 1990 when they went full reporting.
16 Okay. Maybe the tool -- I should have checked that before
17 I left. Maybe we have it back to '99 then.

18 CHAIRPERSON BRADMAN: Dr. Quintana.

19 PANEL MEMBER QUINTANA: I just had a question
20 about your study of the schools. I know this was outside
21 of the purview of your current study, but it would be
22 interesting to know of the children who attend a specific
23 school, how many of them also live within a certain radius
24 of the fields that might be affecting their school. And
25 for elementary schools it might be a higher percentage, so

1 they're kind of getting a double whammy - schools and
2 home. And for high schools maybe a smaller percentage;
3 they draw from a bigger area.

4 But I'm just curious if that would be something
5 possible to estimate, based on the school's knowledge of
6 where their kids live attend the schools.

7 DR. ENGLISH: Yeah. No, it would be possible. I
8 mean, you have to realize we looked at tens of thousands
9 of kids. And, you know, it took years to do this study
10 and years to get it released from the State. So that
11 would be a giant project.

12 (Laughter.)

13 DR. ENGLISH: But, sure, yeah, you could do that.

14 PANEL MEMBER LUDERER: That was really
15 fascinating. You know, I was struck by the methyl bromide
16 and that that was still number 3 in 2010.

17 DR. ENGLISH: Yeah.

18 PANEL MEMBER LUDERER: I thought it was already
19 phased out, so that's --

20 DR. ENGLISH: Not then, but it -- I mean, you
21 look at the data and it really is getting phased out.

22 CHAIRPERSON BRADMAN: I believe that 2017 --

23 DR. ENGLISH: Next year, I think it's supposed to
24 be totally out, right?

25 CHAIRPERSON BRADMAN: Yeah.

1 DR. ENGLISH: Um-hmm.

2 CHAIRPERSON BRADMAN: I just --

3 DR. ENGLISH: What are they replacing that with,
4 do we know?

5 CHAIRPERSON BRADMAN: Basically, there's been --

6 DR. ENGLISH: They just have some --

7 CHAIRPERSON BRADMAN: From what I can see,
8 there's been increasing use of chloropicrin and Telone may
9 also be increasing. And there's also a certain amount of
10 work going on for fumigant alternatives.

11 DR. ENGLISH: Um-hmm.

12 CHAIRPERSON BRADMAN: I had a question about the
13 linkage, because this is something we've had trouble with,
14 especially going back to 2000, is it sounds like you were
15 able to actually use the CAC data and link individual
16 pesticide use reports to individual fields.

17 DR. ENGLISH: For one year only.

18 CHAIRPERSON BRADMAN: Okay.

19 DR. ENGLISH: 2010.

20 CHAIRPERSON BRADMAN: Okay. Yeah, and if I
21 remember correctly, going back that's not possible.

22 DR. ENGLISH: Sure, it's possible. I mean,
23 again, we're talking about political will issues. I mean,
24 there -- certain advocates wrote to DPR about, well, you
25 know, can't we get this data centralized, and they just

1 said - beyond our scope, we can't do it. I mean, we did
2 it, you know, and it's not -- you know, I don't feel it's
3 the Health Department's responsibility to do that. I
4 think really the Ag Commissioners, DPR, they should be
5 providing this data to the public and to researchers. And
6 we spent a lot of resources doing that, you know, so they
7 could do it if they wanted.

8 CHAIRPERSON BRADMAN: But in the PUR reports, I
9 mean, at least right now even at the county level, is
10 there a linkage between a field identification number and
11 a pesticide application?

12 DR. ENGLISH: Oh. Yeah. That's -- you still
13 would have to get those field -- the boundaries. But once
14 you have -- once you have the boundaries, you can link it
15 on ID number. That's what we did, yeah.

16 Yeah, Jenny.

17 PANEL MEMBER QUINTANA: I just had a
18 clarification question. I think I took confusing notes
19 for myself, but did you say you could -- one of your ideas
20 was you could search for exposure within a quarter mile of
21 the address and the birth records?

22 DR. ENGLISH: Um-hmm.

23 PANEL MEMBER QUINTANA: But I thought you said
24 earlier that the database was only within a mile section
25 block or am I misunderstanding?

1 DR. ENGLISH: No. You can put in any distance
2 you want.

3 PANEL MEMBER QUINTANA: But if it's data -- is it
4 true that a section block is the finest resolution --

5 DR. ENGLISH: Right.

6 PANEL MEMBER QUINTANA: -- that you have?

7 DR. ENGLISH: Right, a square mile.

8 PANEL MEMBER QUINTANA: Square mile. So a
9 quarter from that square mile, is what you're thinking?

10 DR. ENGLISH: Yeah, from where the boundary gets
11 set, yeah.

12 PANEL MEMBER QUINTANA: From the boundaries of
13 that mile. Okay. Okay. All right.

14 DR. ENGLISH: Yeah, you just have to have -- you
15 know, know the assumption that the actual application
16 you're pulling out of the data could be anywhere in that
17 one square mile area, which isn't all that great, you
18 know.

19 PANEL MEMBER QUINTANA: Okay. Thank you.

20 DR. ENGLISH: But that's how most of the
21 published studies -- most or all the published studies
22 that I know of use that data, the one square mile data,
23 because, yeah, it's just -- it's only available for one
24 year. And usually you want to use multiple years.

25 PANEL MEMBER QUINTANA: So one more follow-up

1 question. So I guess with your doing it in such a careful
2 good way, could you find out the error by just looking at
3 it old the fashioned way so to speak?

4 DR. ENGLISH: Yeah, I mean --

5 PANEL MEMBER QUINTANA: Could you make estimates
6 of the air that could be introduced, because you have both
7 for your data.

8 DR. ENGLISH: Yeah, I could. We could, and then,
9 you know, fortunately, we were -- it was only one -- less
10 than one percent of the linkages we did was using the one
11 square mile data. So we had more accurate ways of doing
12 it for this study.

13 PANEL MEMBER QUINTANA: No, but I was thinking
14 you could tell other people how --

15 DR. ENGLISH: Oh, yeah, exactly.

16 PANEL MEMBER QUINTANA: -- how off they were or
17 how off they could, you know, because you could have them
18 both -- you could compare them both.

19 DR. ENGLISH: Right.

20 CHAIRPERSON BRADMAN: So are there any more
21 clarifying questions?

22 PANEL MEMBER KAVANAUGH-LYNCH: I have one. I
23 noticed that you were using the quarter mile within it.
24 And you explained the rationale for that, but you also
25 mentioned the drift can be up to 70 kilometers.

1 DR. ENGLISH: Um-hmm.

2 PANEL MEMBER KAVANAUGH-LYNCH: So -- which is a
3 whole lot more than a quarter mile.

4 I'm wondering if -- about the possibility of
5 doing something that takes a wider range into --

6 DR. ENGLISH: Yeah.

7 PANEL MEMBER KAVANAUGH-LYNCH: -- or wider
8 distance into consideration, and maybe, you know, a
9 weighting for the amount of distance.

10 DR. ENGLISH: Yeah. I mean, we -- when we were
11 doing the project, that issue came up and we thought about
12 doing a sensitivity analysis with different size buffers
13 and things like that, that because -- I think our
14 computers are a lot faster now, then we did it, but
15 because of all the -- you know, we're processing millions
16 of records, and we were kind of like, going, wow, this is
17 taking a year already to do a quarter mile. We -- kind of
18 our IT people kind of nixed the idea, like, oh, yeah,
19 we'll do that after the report, you know, was done.

20 Sadly, our main person passed away who kind of
21 came up with all this ideas and stuff. So some of the
22 momentum was lost. But also when we went through a very
23 difficult process of getting this released, we kind of
24 lost some enthusiasm also about going through this again.

25 But, yeah, that would be good to do some

1 sensitivity analyses for different things. And I think
2 some -- I don't know, have you ever done that Asa? Have
3 any of you done other -- or you proposed that, I think, at
4 least.

5 CHAIRPERSON BRADMAN: We tried working with the
6 Department of Water Resources data --

7 DR. ENGLISH: Yeah.

8 CHAIRPERSON BRADMAN: -- and then compared that
9 to using proportions of one square mile, which I'll talk
10 about in a bit. And the problem we had is that the
11 farm -- the land ownership maps had IDs that were tied to
12 ownership, not to individual parcels of land.

13 DR. ENGLISH: Oh.

14 CHAIRPERSON BRADMAN: And ownership of land,
15 there could be a piece of land here, and a piece of land
16 there, even in a different section, but they'll have the
17 same field identification or ownership identification,
18 because they're owned by the same entity.

19 So we weren't able to have a Pesticide Use
20 Reporting application tied to a field ID, and therefore we
21 couldn't really use that approach.

22 DR. ENGLISH: Oh.

23 CHAIRPERSON BRADMAN: We tried. I mean, this, of
24 course, was looking back at 2000 data.

25 DR. ENGLISH: Um-hmm.

1 MS. CHRISTENSEN: We've had a suggestion from
2 people on the phone to please speak more clearly into the
3 mics. They're having trouble hearing it over the line.

4 MS. DUNN: Should I read the comment?

5 DR. ENGLISH: Is there more to the comment
6 than --

7 MS. DUNN: "So it would be great to use
8 biomonitoring to look at exposures to teachers and school
9 staff. Many of these employees are at child-bearing age
10 and they will have exposure for many years. Teachers and
11 staff sometimes stay in the same school for decades."

12 DR. ENGLISH: That would be great.

13 (Laughter.)

14 CHAIRPERSON BRADMAN: I think, at this point,
15 we'll stop with the clarifying questions, and then we have
16 another presentation, and then we'll have more opportunity
17 for discussion and public comment.

18 (Thereupon an overhead presentation was
19 presented as follows.)

20 MS. CHRISTENSEN: Paul, did you take the mic?

21 DR. ENGLISH: What was the question?

22 (Laughter.)

23 DR. ENGLISH: Did I steal something?

24 (Laughter.)

25 CHAIRPERSON BRADMAN: All right. Thank you. Can

1 everyone hear me okay?

2 I'm hoping that the people on-line can also hear
3 me well. I'll try to speak up a little bit.

4 So I'm supposed to introduce myself. I think
5 almost everyone knows me. But I helped co-found the
6 Center for Environmental Research and Children's Health,
7 at UC Berkeley, and have been working for many years on a
8 study -- cohort study looking at environmental exposures
9 and children's health and development in the Salinas
10 Valley. We'll talk a little bit about that today. We're
11 looking at pesticides, but also lots of other exposures
12 too, flame retardants, social factors, pollen and mold.
13 It's not just a pesticide study.

14 And then I've also done a lot of work in other
15 arenas, like environmental health and child care, and
16 other topics as well.

17 So -- and again, I'm at the Center for
18 Environmental Research and Children's Health, and I'm also
19 in the Department of Environmental Health Sciences at UC
20 Berkeley. So I wanted to talk a little bit just to kind
21 of help frame some of the discussion later today and
22 perhaps add a little bit of information to the
23 presentation we just heard around considerations for
24 biomonitoring pesticides.

25 --o0o--

1 CHAIRPERSON BRADMAN: So just to give kind of a
2 brief outline of today's talk, I'll give -- I have a brief
3 refresher on exposure biomarkers. We've talked about this
4 at various times, and I did a presentation a couple of
5 years ago. And we'll just kind of remind ourselves on
6 that. And then I'll present some new data on recent
7 epidemiologic analyses. We actually had a paper that came
8 out this week that used some of the data that Paul just
9 talked about.

10 And I just want to highlight when we think about
11 exposures - where do children spend time, and what
12 pesticides are used there, and I hope we can discuss that,
13 in terms of priorities for biomonitoring, and then
14 considerations for biomonitoring pesticides.

15 --o0o--

16 CHAIRPERSON BRADMAN: So just a brief refresher
17 when dealing with biomarkers of exposure. Usually, we're
18 measuring metabolites in urine. Not always, but often for
19 these nonpersistent compounds, we're measuring metabolites
20 in urine. If we're looking at the parent compound in
21 blood, there's still a relatively short half-life in the
22 body and we have some of the same issues we find with
23 urine.

24 And importantly, one of those is high
25 intra-individual variability, or high within-person

1 variability, which makes it difficult to take a given
2 measurement and use that to predict exposure in a longer
3 time frame.

4 Also, when you measure a metabolite, it may be
5 class, but not pesticide-specific. That's true for the
6 DAPs, for organophosphates, also some of the pyrethroid
7 metabolites. So we don't really know when we measure
8 something, whether we're looking at a really toxic OP or a
9 less toxic OP when we look at the same metabolite.

10 And then we have this issue that metabolites in
11 urine may reflect, in some cases, preformed metabolites in
12 the environment. In other words, a material breaks down
13 into its degradate, and then you're exposed to it and you
14 excrete it unchanged, you're getting exposed to a less
15 toxic material. And therefore, you may overestimate
16 pesticide or other exposures for the metabolite.

17 However, given all those limitations, many
18 studies show clear links between determinants of exposure
19 and metabolite levels in urine. And we've -- there's a
20 number of epi studies, ours and others, that have shown
21 associations, for example, with pesticide exposure, and
22 adverse health outcomes, at least for organophosphates.

23 And importantly, it's -- urine samples and
24 measuring metabolites in urine is easy, because it's easy
25 to collect urine samples. They're not invasive especially

1 for children.

2 --o0o--

3 CHAIRPERSON BRADMAN: So I just want to highlight
4 a few kind of recent results that we have from our
5 CHAMACOS study. Just a reminder, this is the study we
6 have in the Salinas Valley that's investigating
7 environmental health in children. And we first got this
8 going - in 1998 is when we founded the study, and we
9 started enrolling people in 99/2000.

10 --o0o--

11 CHAIRPERSON BRADMAN: Just a reminder, we're
12 focusing on the Salinas Valley. It's an agricultural area
13 in Monterey County. This gives you kind of a sense of
14 organophosphate pesticide use compared to the State on the
15 right, and then within the valley itself.

16 And you can see here we used the mapping tools
17 that Paul just talked about to, in this case, look at
18 organophosphate pesticide use during the enrollment period
19 of our study 1999/2001 in the Salinas Valley. And it
20 lights up as an area with relatively heavy use compared to
21 other locations in the State.

22 --o0o--

23 CHAIRPERSON BRADMAN: This is a cohort study.
24 Just a reminder, this slide needs to be updated. We're
25 actually -- our kids are just turning 16 right now, and

1 we're doing our 14- to 16-year visits right now. We've
2 had contact during pregnancy and at multiple birth, and
3 then multiple times as children age.

4 --o0o--

5 CHAIRPERSON BRADMAN: So just a little example
6 here of some biomonitoring data just to characterize some
7 of the things we found.

8 One, if you look at the -- and I presented this
9 before, so I'm going to be very brief. If you look at the
10 blue columns here, that's CHAMACOS, and the green is
11 NHANES. During pregnancy, to the left of this dotted line
12 is the pregnant moms, and you'll see the levels are
13 generally higher than they were in the NHANES, which is
14 women of child-bearing age.

15 So there's some evidence here for higher
16 exposures. And if you look at the kids on the right, at
17 six months going up to five years, the levels increase,
18 and by the time we get to five years, they're higher than
19 the youngest age group looked at in NHANES. So there's
20 some evidence too that there are higher exposures in our
21 kids compared to NHANES. We haven't actually measured
22 levels in our older kids yet.

23 But I also want to point out here, we were able
24 to successfully collect urine samples from kids as young
25 as six months. So we did this at 6, 12, 24 months. In

1 those age ranges, we used urine bags. And just to
2 underscore that it is feasible, and this was a fairly
3 large scale study, to collect urine and try to assess
4 exposures in very young kids.

5 As a side anecdote, you know, we put a lot of
6 effort into this. We estimated that the value of the
7 urine from the six month olds in particular was probably
8 worth more than its weight in gold.

9 (Laughter.)

10 --o0o--

11 CHAIRPERSON BRADMAN: But even still, it was
12 feasible. And we can look at exposures to very young
13 children using some of these tools.

14 --o0o--

15 CHAIRPERSON BRADMAN: Despite the limitations, I
16 mentioned earlier about biomarkers, we have seen very
17 consistent associations between higher urinary metabolite
18 levels of the dialkyl phosphates, the organophosphate
19 metabolites, in the pregnant women and poor outcomes in
20 the children.

21 Just very briefly, we've seen shorter gestation,
22 more abnormal reflexes in newborns, behaviors --
23 potentially related to behavior pervasive developmental
24 disorder at two years, poorer neurodevelopment at several
25 age points through age seven, attention deficits at age

1 five.

2 There's been consistency across age points, and
3 we've continued these analyses now looking at older kids,
4 and at 11 and 12 years, we're still seeing consistent
5 associations between these early prenatal exposures, and
6 poorer neurodevelopmental outcomes in the children. So at
7 least one thing we look for there's some internal
8 consistency in our study, and some consistency with other
9 studies in other regions in the country.

10 --o0o--

11 CHAIRPERSON BRADMAN: So just to kind of review
12 now some of the more recent findings that we've had, one
13 of which in a paper - actually it just came out this week.
14 But just a reminder, I presented this a couple years ago,
15 and this is kind of a simple summary of the relationship
16 between poorer -- higher exposure prenatally, and poorer
17 outcomes in the kids. So we had low, medium, and high
18 exposure in the moms during pregnancy. And if we look at
19 the IQ score, the low kids, as a group, were up around
20 107, and the high kids -- higher exposure as a group were
21 around 100. So there's about a seven -- six or seven
22 point difference in the high exposure point. And that was
23 something we've talked about for some time.

24 --o0o--

25 CHAIRPERSON BRADMAN: One thing we were

1 interested in was whether there are interactions between
2 these exposures and other factors that influence child
3 health and development. We know that, you know, if you --
4 if have read to children, if you have a stimulating
5 environment, if you have less stress, people tend to be
6 healthier. And there's some evidence with lead and other
7 toxicants that where you have exposures to both adversity
8 and toxicants, there's a potential for a synergistic or
9 additive effect, or some sort of interaction between those
10 exposures and poorer outcomes in the children.

11 --o0o--

12 CHAIRPERSON BRADMAN: And this kind of provides a
13 little theoretical framework here, where we know stress --
14 more stress is not good for neurodevelopment, and then
15 this question of whether prenatal neurotoxic exposures.
16 In this case, we're looking at the organophosphate
17 pesticide metabolites interact with this stress and affect
18 development in the kids. I want to ask, too, if somebody
19 could keep me up on the time --

20 MS. HOOVER: Sure. Yeah, that's fine.

21 CHAIRPERSON BRADMAN: -- because I'm not timing
22 myself.

23 --o0o--

24 CHAIRPERSON BRADMAN: Okay. So just to kind of
25 highlight some of the challenges in this agricultural

1 community, we have a lot of crowding in terms of, you
2 know -- in terms of housing quality. I'll talk a little
3 bit about it in a second, but there's a lot of crowding, a
4 lot of pest infestations. Many participants in our
5 population report some food insecurity, i.e., not having
6 enough money to buy food in certain times of the year.
7 Many households have few stacking toys, blocks, other kind
8 of toys that kids can play with and have stimulation.

9 Just to kind of put in picture some of these --
10 you know, some of these stresses, these are some pictures
11 of poor housing quality in the area. About 40 percent of
12 the households we looked at had mold problems, poor
13 structural elements and rot here. This is actually
14 cockroach feces on a door here in a building that was shut
15 down by the county, because there are problems with
16 maintenance and crowding.

17 And this here is Chinese chalk, a miraculous
18 chalk. It's form of deltamethrin. Most of it, I think,
19 is off the market at this point, but this was commonly used
20 for things like cockroaches and ants. A lot of cockroach
21 infestation in the homes.

22 --o0o--

23 CHAIRPERSON BRADMAN: So just to make the point
24 when we talk about development, there's a lot of factors.
25 And I think this kind of highlights a lot of the social

1 components of what our community faces. You know, these
2 kids are living -- don't have a great place to play.
3 They're in a parking lot across the street from a liquor
4 store. We've actually had two kids in our studies killed
5 by cars backing out of soft story garages like this, and
6 the kids were playing in the parking lot. So there's
7 potentially a lot of sources of stress --

8 --o0o--

9 CHAIRPERSON BRADMAN: -- that could, you know,
10 interact with these environmental exposures.

11 So when we look at the relationship between the
12 prenatal exposures and outcomes in the kids, again this is
13 at seven years, whether we look at kids with relatively
14 low family adversity, so these are homes where, for
15 example, the parents -- the father is not going away to
16 work in the field in Arizona during the winter. There's
17 higher income. There's less, you know, division in the
18 family. There's a whole set of things that we looked at.

19 We have an association where for each kind of
20 unit of prenatal -- exposure to prenatal OPs, we loose
21 about two and a half points in IQ, and it's not
22 statistically significant. But when we look at the kids
23 where there was higher family adversity, and again, we're
24 talking family here, not outside in the community. So
25 we're actually -- going forward, we're going to be looking

1 at factors like neighborhood quality, crime, and things
2 like that. But this is stress within the family. We see
3 the slope is much steeper, and it's statistically
4 significant. They're losing about eight points for every
5 unit of exposure to OPs during pregnancy.

6 So there's evidence really of an interaction
7 here. And I want to kind of highlight our graduate
8 students that have worked on this, and that was also
9 recently published.

10 --o0o--

11 CHAIRPERSON BRADMAN: And now to present this
12 kind of visually in a way, I think it's a little easier to
13 have that background before walking through, you can see
14 here -- this red line here is for the group with higher
15 family adversity. And this is now the verbal
16 comprehension score of the WISC child development tool.
17 And again, you can see that these slopes are different.
18 It's steeper for the kids that have higher adversity, you
19 know, greater than the mean versus kids that have less,
20 and it's statistically significant.

21 So there's here an interaction between these
22 factors in development in the children, and it also
23 underscores, I think, some of the validity of also our
24 biomonitoring measurements to characterize exposure, that
25 we see these kinds of associations. You know, this is how

1 we would hypothesize the direction to go in. And if the
2 exposure measurements were noise, we wouldn't see -- we
3 would see noise in the outcome.

4 --o0o--

5 CHAIRPERSON BRADMAN: We've also looked at asthma
6 and respiratory disease and symptoms, partly because
7 there's been evidence occupationally that organophosphate
8 pesticides are associated with breathing problems.

9 --o0o--

10 CHAIRPERSON BRADMAN: And we do find in the kids,
11 particularly both for respiratory symptoms and for lung
12 function associations between higher exposure, in this
13 case though during childhood and poorer lung function in
14 the kids. And it kind of made sense that concurrent
15 exposures with the kids would result in breathing
16 problems, if there's an association.

17 And you'll see here, these slopes here are
18 negative. Here, we have kind of the slopes plotted, and
19 these are statistically significant. So kind of what this
20 is showing, that for higher exposure to the kids during
21 childhood, they have slightly lower forced expiratory
22 velocity in one second. So this is how much air they can
23 breath out in one second. They do a big huff.

24 And that's an indicator of lung function. I
25 should mention here that what we did is we had multiple

1 measurements up to age seven of metabolites in urine. So
2 we looked at the area under the curve as kind of an
3 integrated measure of exposure.

4 So and again, the prenatal DAPs were not
5 associated with lung function.

6 --o0o--

7 CHAIRPERSON BRADMAN: So now to kind of move
8 ahead a little bit to some of the work that perhaps
9 resonates with the work that Paul did, we've tried to also
10 look at the PUR data. Given the problems with urinary
11 metabolites that I mentioned before, in terms of
12 variability, preformed DAPs, et cetera, are there other
13 metrics of exposure we can use?

14 So we use the Pesticide Use Reporting data.
15 We've already kind of a summary of what information is
16 available.

17 --o0o--

18 CHAIRPERSON BRADMAN: And we used kind of what I
19 think Paul would call the old-fashioned method to estimate
20 exposure, partly because, as I mentioned earlier, we
21 weren't able to link the individual fields to individual
22 Pesticide Use Reporting reports. So just to kind of give
23 you a visual, so we have a residence here. We draw a
24 circle around it of a given buffer, and then we calculate
25 the area within that buffer. And this one, it's about 85

1 percent, so 85 times 200 is about 170 kilograms. So we
2 would assume that there was even distribution of pesticide
3 use in that unit, and then that we can kind of add up all
4 these little percentages.

5 So just to quickly go through this, you can see
6 the buffer kind of had different levels of overlap with
7 different sections. And then we weighted that -- used
8 that weighting to estimate pesticide uses within the
9 buffer. That's certainly cruder than what we heard
10 earlier that Paul did. And this is an approach that many
11 have taken. We've also done some work trying to weight
12 this by wind direction.

13 --o0o--

14 CHAIRPERSON BRADMAN: So interesting, I mentioned
15 earlier that we had a -- we have an association here
16 between higher exposure and lower scores, and IQ at seven
17 years. Now, this is a model, however, where we have both
18 urinary DAPs and nearby agricultural use in this same
19 model.

20 And what we found was that agricultural use near
21 the home was significant -- statistically significant, and
22 inversely associated with poorer neurodevelopment outcome,
23 again this is at seven years, in the children. And that
24 was independent of the urinary metabolite levels.

25 --o0o--

1 CHAIRPERSON BRADMAN: So we've -- just to
2 summarize, with increasing use of OPs near homes, we had
3 about a two point decrease in IQ that's similar, a little
4 bit lower, but similar to some of the magnitude of slopes
5 we've seen for OP metabolites, and they were independently
6 associated. And this has kind of raised for us, you know,
7 a lot of questions about how to think about what does the
8 biomonitoring measurement mean, and then what does the
9 environmental characterization mean in terms of pesticide
10 use as indicators of exposure.

11 We know that the metabolites are relatively
12 short-lived, and maybe they're reflecting a shorter term
13 of exposure. We did take the average of our pregnancy
14 samples when we used that, so that's perhaps evening it
15 out a little bit.

16 Does it perhaps reflect different pathways?

17 One issue with the PUR data is that we can sum
18 all of the pesticide use in your homes. We can even
19 weight it for toxicity using EPA relative potency factors.
20 The metabolites in urine, there's some OPs that don't
21 devolve to those metabolites, so we're missing them.

22 And perhaps also, there's better resolution,
23 because we're able to, in the PUR data, look at individual
24 pesticides. And interestingly, I gave you the overall
25 slope for organophosphates used nearby as some, but we

1 found the strongest slope for this one particular
2 pesticide oxydemeton-methyl, and oxydemeton-methyl is by
3 far the most toxic of the OPs that were used in the
4 Salinas Valley during the time of this -- beginning of
5 this study.

6 So there's kind of some interesting issues here
7 and challenges when we think about how to use the
8 biomarker and how to use these other metrics of exposure.

9 --o0o--

10 CHAIRPERSON BRADMAN: So also when we think about
11 biomonitoring, it's not just the epidemiologic context, we
12 want to think about what we want to measure and where are
13 kids getting exposed.

14 We've heard already about agricultural
15 communities, and perhaps some of the work that Paul did
16 gives us some ideas to prioritize, compounds for
17 biomonitoring. I just kind of want to remind us though
18 that pesticides are used in many different environments,
19 and where kids spend a lot of time.

20 And I want to just highlight homes and child
21 care, but certainly not actually exclude schools, because
22 certainly there's also materials used there by school
23 staff.

24 --o0o--

25 CHAIRPERSON BRADMAN: This is a graph here of

1 overall insecticide use in California. We only go to
2 2011, but if we continue out to 2014, this trend is still
3 significant where there's an overall decline over time of
4 pesticides. And the red here is organophosphates that
5 pretty much in all categories there's declining use of
6 insecticides in California, probably because of more
7 efficient applications, and, you know, better use of
8 technology to control pests.

9 And just to highlight though, this little band
10 here has gotten a little bit thicker. It's small relative
11 to the total, but that represents the neonicotinoids,
12 which have actually increased over the past year, although
13 the overall use of insecticides is going down.

14 --o0o--

15 CHAIRPERSON BRADMAN: And just to give a little
16 more detail for the neonicotinoids, you can see it's
17 mainly dominated by imidacloprid, but there's other ones
18 that are showing up. And I'm sure if we extend this data
19 out to 2014, we'd see that trend continue.

20 --o0o--

21 CHAIRPERSON BRADMAN: But this graph here now, I
22 think, is really interesting and just kind of reminds us
23 of some of the challenges of when we think about pesticide
24 use reporting data, and also biomonitoring. So this shows
25 changes in organophosphate pesticide use between 1992 and

1 2014. And like the overall State, there's been kind of a
2 trend of decreasing use of OPs.

3 But within that, there's also been changes in the
4 mixture, which, for example, we don't really reflect in
5 our biomonitoring. But if we look at when we started our
6 study in 2000, there was a lot of use of diazinon. There
7 was a lot of use of chlorpyrifos and a lot of use of
8 oxydemeton-methyl.

9 But when we go out to the most recent data set
10 2014, these compounds decline to almost zero. So just a
11 reminder that when we do biomonitoring, we may be
12 reflecting different mixtures, and that has different
13 implications, potentially for epidemiologic studies, and
14 also if you're using the data for risk assessment
15 especially, when you have class-specific, but not
16 pesticide- or compound-specific metabolites.

17 --o0o--

18 CHAIRPERSON BRADMAN: Just a reminder, in home
19 pesticide use, that environment, in our study in Salinas,
20 about 65 percent of homes had, you know, cockroaches or 60
21 percent, about half were using pesticides to control pest
22 infestations.

23 And home pesticide use has really dominated still
24 in California by pyrethroids, but there are other
25 compounds that are increasing, including neonicotinoids,

1 especially imidacloprid. And just a reminder that a lot
2 of people are using pesticides on their pets to control
3 fleas. Imidacloprid is a big one, but also there's a
4 bunch of new products on the market that we may want to
5 consider.

6 And I've been into child care facilities, for
7 example, family child care facilities, where they would
8 never use a pesticide in the home, but they are losing on
9 their pet. And just a reminder that that's a really
10 common use. And that when we think about pesticide
11 exposure, we can't think just agriculture.

12 --o0o--

13 CHAIRPERSON BRADMAN: Another environment that
14 I've been doing a lot of work in is child care. And we
15 should remind ourselves that this is a place where many or
16 most children in California, very young children, at
17 vulnerable age points, spend a lot of time.

18 There's 45 -- about 45,000 licensed child care
19 facilities in California. There's about a million kids in
20 child care. And some kids spend up to 50 hours a week, 10
21 hours a day. They have both their parents working
22 full-time. So definitely an important place where kids
23 spend time.

24 --o0o--

25 CHAIRPERSON BRADMAN: We did a survey, funded by

1 DPR, published in 2010, so this is a little bit old, but
2 in that survey about 90 percent of child care facilities
3 reported at least one pest problem, about half were using
4 sprays to control pesticides, and about 20 percent
5 reported monthly or more frequent applications, which is
6 pretty frequent.

7 Now, this is already -- you know, we collected
8 the data, what, 2009, so this is already seven or eight,
9 nine years old. DPR has been really implementing
10 extensive training on integrated pest management. And
11 through the Healthy Schools Act and revisions, there's
12 been a big effort to really encourage IPM. So I suspect
13 that some of the things we found here back, you know,
14 before 2010, have changed. But just to underscore, a lot
15 of these materials are used. And I've also done some
16 sampling in Alameda and Monterey county and we still
17 found, this is now a little more recent, we still found
18 relatively common pesticide use, and we detected a number
19 of pesticides in dust, indicating exposure to the kids,
20 including pyrethroids, which were basically in almost
21 every dust sample we collected.

22 We did both Alameda and Monterey county, so we
23 found both diazinon and chlorpyrifos both ag use, and
24 there was prior use indoors. Interestingly dacthal, which
25 is an agricultural herbicide, we only found in regions

1 that were agricultural. So some evidence that, you know,
2 nearby pesticide use does ingress into indoor
3 environments, where kids spend time. And we should think
4 about that in terms of exposure.

5 And then if we, -- DPR actually has the Pesticide
6 Use Reporting data for schools and child care, it's really
7 just the beginning. And with new revisions to the Healthy
8 Schools Act starting in 2016, that database will probably
9 get a lot better.

10 I'm sure some of the people listening could
11 provide more details on that, but of pesticides that come
12 up in terms of current information, pyrethroids definitely
13 are probably the most common, but we also see, for
14 example, some neonicotinoids and other compounds as well.

15 And I kind of just want to underscore it's
16 important to think about where kids spend time, and what
17 material you use there when we think about biomonitoring.

18 --o0o--

19 CHAIRPERSON BRADMAN: So just a reminder when we
20 consider for biomonitoring for pesticides, you know, we
21 have -- in this some cases, we're kind of stuck with
22 urinary metabolites. We really, I think, should get more
23 information on the validity of urinary metabolites as
24 exposure biomarkers in terms of how good a spot sample is
25 say versus a 24-hour sample is, and then the issues around

1 variability over time, how good does one sample
2 characterize exposure for a week, more or less.

3 Of course, the issue of preformed metabolites.
4 And also, you know, one issue that, you know, we often
5 hear about, pesticide use does not necessarily equal
6 exposure. So the biomonitoring can help answer questions
7 about that.

8 So kind of out this discussion, and we'll hear
9 some more today, as a Panel, as a Program, we need to
10 prioritize, you know, what pesticides to monitor for, and
11 what to test for. And I think really thinking about where
12 they're used, and where kids spend time, where people
13 spend time can help guide that.

14 --o0o--

15 CHAIRPERSON BRADMAN: So thanks to our funders
16 for a lot of the work around CHAMACOS, NIEHS, and EPA, and
17 some support from NIOSH.

18 --o0o--

19 CHAIRPERSON BRADMAN: And there's some time. I
20 think if I go back to my other role, we have 10 minutes
21 for --

22 (Laughter.)

23 CHAIRPERSON BRADMAN: -- clarifying questions,
24 and then we'll have time for public comment and
25 discussion.

1 (Applause.)

2 CHAIRPERSON BRADMAN: Dr. Schwarzman.

3 PANEL MEMBER SCHWARZMAN: I think I remember from
4 either a presentation or reading some of the CHAMACOS
5 papers, that you looked at take-home exposures from
6 agricultural workers, as well as proximity to fields as
7 sources of exposure to children or pregnant women in the
8 household. But I seem to remember that proximity to
9 fields turned out to be more important than take-home
10 exposures. Am I right, can you expand on that a little
11 bit?

12 CHAIRPERSON BRADMAN: Well, we did do a study
13 with strawberry harvesters, and we looked at kind of the
14 potential for take-home, in terms of residues on hands,
15 and clothing. We've done some analyses in the kids
16 looking at factors that predict exposure. And it's been a
17 little bit messy when we look at the urinary metabolites.

18 There's -- for the youngest kids, around six
19 months, we saw associations, for example, to be nearby
20 pesticide use, and higher metabolite levels in the young
21 kids. That wasn't consistent across all age points.

22 But when you think about it, kids at six months
23 are kind of sitting there. You know, they're just really
24 getting ready to crawl, or maybe they're crawling, but
25 they're not quite getting out in the world. By the time

1 they're 12 and 24 months, they're toddlers, and 24 months
2 they're really cruising around. They're also eating a lot
3 different foods, so they're getting more dietary
4 exposures. And I think kind of the signal gets messier.

5 We did also look at pesticides in dust. And for
6 some of the more persistent pesticides, like chlorpyrifos,
7 we did see some associations between nearby use, and also
8 things potentially related to take-home exposure, like
9 wearing shoes in the house and things like that.

10 So -- but in terms of health outcomes that really
11 the only consistent associations have been with the
12 biomarkers and with nearby pesticide use.

13 Dr. Bartell.

14 PANEL MEMBER BARTELL: You know, and I want to
15 start with kind of a question for you about the issue
16 raised regarding the variability over time, and the
17 urinary metabolites. It's something that I worry a lot in
18 thinking about how to actually, you know, design sampling
19 strategies or studies that would rely on these as
20 measures.

21 And I think it's really interesting in that in
22 your work you still manage to find a signal in
23 epidemiologic associations despite, you know, what might
24 be some noisy exposure measurements due to the short-term
25 kind of half-life, and maybe temporal variability in

1 exposures.

2 But I think for the California Biomonitoring
3 program, I think it raises some important questions about
4 the extent to which, if California Biomonitoring moves
5 forward with incorporating maybe some urinary pesticide
6 measures and -- or expanding those measures, the extent to
7 which they should consider routinely collecting multiple
8 biomarkers per participant, for example, you know, several
9 urine measurements over a space of a week or several
10 weeks. And I know you have a nice paper in EHP about the
11 sort of high variability within those sort of time series.

12 And I wonder if you have thoughts about that, in
13 terms of how, you know, CDPH and the other actors here in
14 California Biomonitoring might use that information in
15 thinking about sampling designs.

16 CHAIRPERSON BRADMAN: Yeah, I think that's really
17 important for all urinary metabolites we use. And since
18 those are such an important tool to look at exposure. You
19 know, I think in many cases, urinary metabolites provide
20 kind of a population distribution as a snap shot, and we
21 probably can characterize the likely highs, you know, and
22 the shape. But for an individual, you know, over time, we
23 don't know what it looks like.

24 Although, in some studies from CDC with
25 phthalates, over at least a week or something like that,

1 there was relatively low within-subject variability, and
2 relatively high between-subject. That was for adults
3 though.

4 There haven't really been that many studies done
5 for adults overall, but there's a growing literature and
6 there's been very few studies done on children. And I
7 think that's -- you know, I think we really need to do
8 that. And I think perhaps with any biomonitoring study,
9 it would be good if we -- if we're using cross-sectional
10 samples that for a subset we consider taking some samples
11 each day, or a few a week or just to get some information
12 to that.

13 And I think that's really important. I mean, we
14 had that presentation, by, I think it was, Jon Sobus from
15 EPA. That might have been before you were on the Panel a
16 few years ago, but they're doing some interesting
17 statistical work to try to take, you know, spot samples
18 and deal with variability and come up with some way to
19 think about chronic exposures and risk.

20 But I think there's a lot of challenges there.
21 And the more data we actually have, the more we can inform
22 those kinds of analyses.

23 PANEL MEMBER BARTELL: Thanks.

24 PANEL MEMBER QUINTANA: I had a question related
25 to that about the association between your PUR data and

1 your individual metabolites. You, I think, briefly
2 touched on it, but you said both were independently DAP
3 metabolites. The PUR was independently associated with
4 decrements in IQ. But could you comment on, if you looked
5 at those subset of pesticides that would show up in the
6 urine using your measures, how correlated were those two
7 measures with each other.

8 CHAIRPERSON BRADMAN: In the moms, not very
9 correlated. And given that, you know, it's important for
10 the moms, because it's that prenatal data that seems to be
11 associated with the poorer health outcomes as the kids get
12 older, poorer neurodevelopment, but we don't see real
13 strong correlations. We haven't published that yet. We
14 have published some data on the moms, but we tend not to
15 see very strong correlations between, you know, the
16 mothers and nearby pesticide use. So that's kind one of
17 the puzzles we have in our data.

18 PANEL MEMBER QUINTANA: One of the reasons I ask
19 is that you brought up earlier the need to know how --
20 what radius should we draw that circle. And it seems like
21 biological monitoring data would have the ability to
22 perhaps tell us how far the circle should go, if it were
23 perfect data, of course.

24 CHAIRPERSON BRADMAN: Right.

25 (Laughter.)

1 PANEL MEMBER QUINTANA: But, you know, it has the
2 ability to kind of help us see how far away are people
3 affected.

4 CHAIRPERSON BRADMAN: Right. And if you look at
5 the data I first presented by, you know, the overall
6 distribution of the moms, you know, say compared to
7 NHANES, women of childbearing age across the country, you
8 know, our levels in our moms are about 40 percent higher.

9 So if we drew the boundary -- in that case, it
10 was really the whole Salinas Valley. You know, the
11 population distribution was shifted up. But
12 characterizing it on an individual basis relative to local
13 use didn't, you know -- was not very successful.

14 PANEL MEMBER LUDERER: Thanks. That was a really
15 interesting talk. One of the things that I was interested
16 in is -- so for some of these pesticides that are used
17 agriculturally, you know, like the organophosphates that
18 you were talking about, the -- you know, we can do these
19 kinds of comparisons between using pesticide use data
20 versus biomonitoring. We can look at that.

21 But then, and I think we're going to hear more
22 about this later in the afternoon, there are a lot of
23 pesticide uses, and you mentioned some of these, you know,
24 home use, the pet uses, where those kind of data on use
25 are not available, and really biomonitoring is all -- is

1 probably one of the few ways that we have of actually
2 getting any kind of a handle on those exposures.

3 CHAIRPERSON BRADMAN: Yeah, I think that's true.
4 Yeah. So maybe we're done with clarifying questions, and
5 I'll -- okay. Dr. Fiehn.

6 PANEL MEMBER FIEHN: One more. I always wonder a
7 little bit about just the kilograms of application,
8 whereas you also showed the types of pesticides used were
9 very different. And, of course, we know that the efficacy
10 of these pesticides per gram is very different, right, in
11 the home?

12 CHAIRPERSON BRADMAN: Right, very different.

13 PANEL MEMBER FIEHN: So shouldn't that be rather
14 be represented as a weighted score --

15 CHAIRPERSON BRADMAN: Right.

16 PANEL MEMBER FIEHN: -- or so, rather than just
17 the pounds or kilograms applied?

18 CHAIRPERSON BRADMAN: Right. Well, for the OPs,
19 and when we looked at PUR in relation to health outcomes,
20 and we talked about this in the paper, we have done
21 analyses where we use the EPA relative potency factors to
22 weight the nearby pesticide use before we sum it together.
23 And you can do that for organophosphates. You can also do
24 that for carbamates, which have the same mechanism of
25 effect.

1 But, I mean, one issue we've been dealing with is
2 how to deal with it statistically what about when we start
3 looking at other pesticides that are potentially
4 neurotoxic, and some even have no biomarker. There's
5 really not a good biomarker for fumigant exposure, for
6 example, but some of those are probably neurotoxic. You
7 know, then you start trying to look at groupings --
8 somehow grouping exposures across classes. And that's
9 challenging, and we've done -- we've talked a little bit
10 about that in the paper, and we've also -- we're trying to
11 do analyses of that to get at that issue.

12 But once -- once you go across different classes
13 with different mechanisms of toxicity, at least in our
14 case, the reviewers have basically said you can't do it.

15 So maybe I'll sit down now.

16 MS. HOOVER: Hi, this is Sara Hoover. I just
17 want to let you guys know we're going to take a brief
18 break now for the transcriber. So we're going to start
19 back up at 3:00. With Shoba's talk, and then we'll have
20 the full one hour discussion to talk about the first two
21 talks and Shoba's talk, and the three possible pesticide
22 classes. But we'll start promptly at 3:00

23 (Off record: 2:45 p.m.)

24 (Thereupon a recess was taken.)

25 (On record: 3:01 p.m.)

1 CHAIRPERSON BRADMAN: Okay. I think we're going
2 to get started now, if everyone could sit down.

3 Yeah, it's working now. So if everyone could sit
4 down. And I would like to introduce Dr. Shoba Iyer.

5 Dr. Iyer is a staff toxicologist in the Safer
6 Alternatives Assessment and Biomonitoring Section.

7 Her focus since joining OEHHA in 2012 has been
8 researching high-throughput toxicity testing assays, and
9 investigating ways to incorporate these data into
10 chemical-specific health assessments.

11 She is a co-author of two related publications,
12 one that compares ToxCast results for the pesticides
13 endosulfan and methidathion, with results from in vitro
14 and in vivo studies on a range of endpoints, and a second
15 case study that explores chemical activities and hazard
16 traits of ortho-phthalates, based on ToxCast data. She
17 also conducts research to support biomonitoring metals.

18 So Dr. Iyer will present a brief summary of
19 information relevant to possible pesticide classes for
20 future consideration as designated chemicals.

21 So thank you.

22 DR. IYER: Thanks. Is this on? You can hear me
23 okay?

24 Great.

25 --o0o--

1 (Thereupon an overhead presentation was
2 presented as follows.)

3 DR. IYER: All right. So the purpose of this
4 agenda item is to follow up on four previously screened
5 pesticides. OEHHA presented a preliminary screen of the
6 pesticides glufosinate-ammonium, glyphosate, imidacloprid,
7 and propanil at the August 2013 meeting of the Scientific
8 Guidance Panel.

9 The SGP recommended that we continue research on
10 all four as potential designated chemicals. Rather than
11 evaluating these four pesticides individually, we have
12 been reviewing three possible classes that encompass them.
13 These classes are organophosphorus pesticides,
14 neonicotinoid pesticides, and anilide pesticides.

15 Later in this afternoon's session, we'll be
16 inviting Panel and public input on next steps, such as
17 possible future consideration of these classes as
18 potential designated chemicals.

19 --o0o--

20 DR. IYER: So why classes?

21 Well, evaluating chemical classes, rather than
22 individual chemicals, is resource efficient. It allows
23 the Program to quickly respond to shifts in chemical use.
24 It facilitates development of broad lab panels, and it
25 allows for non-targeted screening.

1 --o0o--

2 DR. IYER: In our preparation for this meeting,
3 we researched several topic areas based on input we've
4 received from the SGP and the public, including
5 agricultural pesticides applied near schools using
6 information from the 2014 report that Dr. English
7 described this afternoon, pesticides that are in pet
8 products, such as spot-on treatments and flea collars, and
9 cholinesterase-inhibiting pesticides.

10 --o0o--

11 DR. IYER: Based on our recent research and
12 practical considerations in defining classes, we
13 ultimately chose to focus on pesticides classes that
14 encompassed the four previously screened pesticides. I
15 will make note in my presentation of information relevant
16 to these above three topics here, and I'd be happy to
17 answer more questions about the research I did on those
18 above three topics afterwards.

19 --o0o--

20 DR. IYER: Just as background for our discussion
21 today, these are the criteria for recommending designated
22 chemicals, which framed our preliminary research on the
23 three pesticide classes. The criteria covered the areas
24 shown, which are; exposure or potential exposure, known or
25 suspected health effects, the need to assess the efficacy

1 of public health actions, availability of a biomonitoring
2 analytical method, availability of adequate biospecimen
3 samples, and incremental analytical costs. And just as a
4 reminder, that these criteria are not joined by the term
5 "and".

6 --o0o--

7 DR. IYER: In our preliminary research, we
8 reviewed several broad class considerations. The first is
9 function, which in this case is use as pesticides. When I
10 use the term pesticide, I'm using it in a broad sense that
11 includes, for example, herbicides, insecticides,
12 fungicides, and plant growth regulators.

13 To define classes, we also considered the
14 chemical structures of the pesticides of interest, and
15 common mechanisms of action. We also reviewed toxicity
16 concerns associated with selected pesticides in each
17 class, agricultural use trends in California, and
18 availability of biomonitoring methods. Also, in the
19 document you received, we also included information on
20 pounds of pesticides sold in California in 2014.

21 --o0o--

22 DR. IYER: The first class I'll cover is
23 organophosphorus pesticides, which we are defining broadly
24 based on structure as phosphorus-containing organic
25 compounds used as pesticides. Note that organophosphate

1 pesticides are a subclass of organophosphorus pesticides,
2 and many organophosphates are already on our list of
3 designated chemicals.

4 Organophosphorus pesticides is a broader class
5 and encompasses additional pesticides including glyphosate
6 and glufosinate-ammonium.

7 //

8 On the next slide, I'll be showing you some
9 example pesticide structures, but first I'll briefly
10 outline some toxicity concerns associated with pesticides
11 in this broad group.

12 Exposure to organophosphate pesticides has been
13 linked with neurotoxicity outcomes, such as decreased
14 cognitive function and peripheral neuropathies. With
15 regard to carcinogenicity, dichlorvos, tetrachlorvinphos,
16 and tribufos are listed as known to the State to cause
17 cancer under California's Proposition 65.

18 And in 2015, the International Agency for
19 Research on Cancer classified glyphosate as probably
20 carcinogenic to humans, and a Notice of Intent to list
21 glyphosate under Proposition 65 has been issued.

22 In terms of development, we heard Dr. Bradman
23 recently present a number of effects associated with
24 prenatal urinary levels of dialkyl phosphate metabolites.
25 As another example, glufosinate-ammonium has been shown to

1 affect development in exposed mice.

2 Some endocrine effects of organophosphorus
3 pesticides have been reported based on animal and cell
4 culture studies. For example, chlorpyrifos has been shown
5 to affect the estrogen pathway in rodent and zebrafish
6 models. And as a second example, rats exposed to
7 glyphosate had reduced testosterone levels and altered
8 testicular morphology. Glyphosate has also been shown to
9 affect estrogen and androgen pathways in cell culture.

10 --o0o--

11 DR. IYER: Here are the chemical structures of
12 some example organophosphorus pesticides. The examples
13 shown here are not currently on the list of designated
14 chemicals. And as I just mentioned, many organophosphates
15 are already on the list of designated chemicals.

16 These examples shown here are all used
17 agriculturally in California. The isopropylamine and
18 potassium salts of glyphosate, as well as bensulide,
19 ethephon, and fosetyl-aluminum all ranked in the top 100
20 pesticides, in terms of pounds used, statewide in 2014.
21 Glufosinate-ammonium, bensulide, and ethephon were in the
22 top 10 pesticides applied within a quarter mile of
23 schools, in one or more of the counties assessed in the
24 Tracking Program report that Dr. English described. And
25 bensulide and ethephon are cholinesterase inhibitors.

--o0o--

DR. IYER: Okay. Here's a graph showing annual agricultural use of glyphosate in California from 1990 to 2014. I'll make a note here -- agricultural use is broadly defined to include use on crops, as well as, for example, landscape maintenance.

So in this graph, the black triangles here represent the sums of all forms of glyphosate used in a given year. The other data points show some of the specific forms of glyphosate.

As shown, the isopropylamine salt and potassium salt are the major forms of glyphosate used in recent years. There are approximately 200 products containing glyphosate that are registered for use in California. This includes herbicides containing glyphosate that are widely used for consumer home and garden use and are available in retail stores and on-line.

--o0o--

DR. IYER: Here I'm showing you a graph of annual agricultural use of glufosinate-ammonium, ethephon, bensulide and fosetyl-aluminum. Interestingly, the agricultural use of glufosinate-ammonium was reported to drop substantially after reaching a peak in 2011. And this type of pattern illustrates the benefits of a class-based approach.

1 As some individual pesticides in a class decrease
2 others will increase, and the class listing will capture
3 all of these. I'll all also note that we're aware of the
4 development of crops that have co-resistance to glyphosate
5 and glufosinate-ammonium, which would suggest possible
6 expanded use of glufosinate-ammonium again in the future.

7 --o0o--

8 DR. IYER: There are many biomonitoring studies
9 of organophosphate pesticides, a subclass of
10 organophosphorus pesticides. Here in this slide, I list
11 selected references on glufosinate-ammonium, and/or
12 glyphosate measured in serum and/or urine. These two
13 pesticides are not currently on our list of designated
14 chemicals.

15 The references shown here, and in later slides in
16 my talk, include both methods papers and biomonitoring
17 studies. So as you can see in this table,
18 glufosinate-ammonium has been measured in both serum and
19 urine. Glyphosate and its major breakdown product,
20 aminomethylphosphonic acid, or AMPA, have both been
21 biomonitored in urine.

22 I'll give you a little more information on one of
23 our selected references, Adams et al., 2016. Dr. Axel
24 Adams and colleagues in Dr. Roy Gerona's lab at UCSF
25 recently developed a method to measure glyphosate in

1 urine, and are currently working on a method for AMPA. As
2 reported in their recent poster, glyphosate was detected
3 in 93 percent of 131 urine samples tested. We have been
4 in touch with Dr. Adams, and he could be a resource for
5 our laboratory in the future.

6 The current Biomonitoring California lab
7 capability for organophosphorus pesticides is for
8 organophosphates only, that is, nonspecific dialkyl
9 phosphates and specific metabolites for chlorpyrifos and
10 diazinon.

11 --o0o--

12 DR. IYER: The second class I'll go over is
13 neonicotinoid pesticides. These pesticides share a
14 mechanism of action as they bind to and activate the
15 nicotinic acetylcholine receptor. Potential toxicity
16 concerns associated with pesticides in this class include
17 immunotoxicity and developmental neurotoxicity. And I'll
18 go over some examples.

19 Studies in rodents exposed to imidacloprid have
20 found immune effects such as suppression of delayed type
21 hypersensitivity, decreased stimulation index of T
22 lymphocytes and compromised immune system.

23 And as another example, rats exposed to
24 acetamiprid had decreased lymphocyte proliferation, and
25 macrophage function. With regard to developmental

1 neurotoxicity, the European Food Safety Authority has
2 concluded that both imidacloprid and acetamiprid show some
3 indications of developmental neurotoxicity potential,
4 based on available data.

5 --o0o--

6 DR. IYER: Here are the chemical structures of
7 some example neonicotinoid pesticides. Currently, there
8 are no neonicotinoids on the list of designated chemicals.
9 These example neonicotinoids are all used agriculturally
10 in California. Imidacloprid ranked in the top 100
11 pesticides in terms of pounds used statewide in 2014.

12 --o0o--

13 DR. IYER: Here, I'm showing you a graph of
14 annual agricultural use of imidacloprid. There are over
15 200 products containing imidacloprid that are registered
16 for use in California. This includes insecticides
17 containing imidacloprid that are used for consumer home
18 and garden use, and in pet products, as Dr. Bradman
19 mentioned earlier, that are available for purchase in
20 retail stores and on-line.

21 --o0o--

22 DR. IYER: This will also look familiar. It's
23 essentially the same graph that Dr. Bradman showed earlier
24 on the other -- some other neonicotinoids, but expanded
25 out to 2014. So this shows the annual agricultural use of

1 acetamiprid, thiamethoxam, clothianidin, and dinotefuran
2 and you can see that, in general, since 2011, the trend
3 has been increasing, as Dr. Bradman alluded to.

4 I'll make one note on home use here, dinotefuran
5 is in some insecticide products for consumer home and
6 garden use, as well as in some spot-on pet products for
7 flea and tick treatment.

8 --o0o--

9 DR. IYER: I located a number of recent
10 biomonitoring studies of neonicotinoids, as shown on this
11 slide, all of which were conducted in Japan. As an
12 example of some recent findings, Harada et al. reported
13 detection frequencies of over 90 percent for
14 n-desmethyl-acetamiprid, which is a specific metabolite of
15 acetamiprid, as well as clothianidin, dinotefuran, and
16 thiamethoxam in urine samples collected from Japanese
17 adults.

18 This same research group found an increasing
19 trend in measured urinary neonicotinoid levels between
20 1994 and 2011.

21 --o0o--

22 DR. IYER: And there is no current lab capability
23 for neonicotinoid pesticides.

24 The third class I'll go over is anilide
25 pesticides. Anilide pesticides contain an amide group, in

1 which one hydrogen is replaced by a phenol group. This is
2 a structure-based definition, and I'll show you some
3 example anilide pesticides when I get to my next slide.

4 Anilide pesticides is a broad category, so if the
5 Panel were interested in considering this group further,
6 we would review possible subclasses.

7 There are some potential toxicity concerns
8 associated with pesticides in this broad group. Again,
9 I'll go over some examples.

10 Urinary levels of 3,4-dichloroaniline, the major
11 metabolite of the anilide pesticide propanil were
12 associated with altered cytokine production in
13 agricultural workers, and various immune effects following
14 propanil exposure have been described in in vivo and in
15 vitro models.

16 In terms of carcinogenicity, diuron and sedaxane
17 both have the anilide substructure and are listed as known
18 to the State to cause cancer under California's
19 Proposition 65. Note that sedaxane is not currently
20 registered for use in California. Sedaxane is a
21 relatively new pesticide that was registered by U.S. EPA
22 in 2012.

23 With regard to developmental effects, linuron, a
24 pesticide, containing the anilide substructure, is listed
25 as known to the State to cause developmental toxicity

1 under Proposition 65. And 3,4-dichloroaniline affected
2 development in a study of minnow embryos and larva.

3 --o0o--

4 DR. IYER: Here are the chemical structures of
5 some example anilide pesticides. And none of the
6 pesticides shown here are currently on the list of
7 designated chemicals.

8 This blue outline shows you the anilide moiety in
9 propanil, which is an amide group, in which one hydrogen
10 is replaced by a phenyl group. These example anilide
11 pesticides are all used agriculturally in California.
12 Propanil and boscalid both ranked in the top 100
13 pesticides in terms of pounds used statewide in 2014.

14 --o0o--

15 DR. IYER: Here is a graph showing annual
16 agricultural use of propanil from 1990 to 2014 in the
17 State.

18 --o0o--

19 DR. IYER: And this graph shows annual
20 agricultural use of boscalid, fenhexamid, flutolanil, and
21 fluxapyroxad from 1990 to 2014. You can see a dramatic
22 increase in the use of boscalid starting in 2004.

23 --o0o--

24 DR. IYER: With regard to biomonitoring anilide
25 pesticides, the studies I note on this slide measured

1 3,4-dichloroaniline, or 3,4-DCA, in urine. 3,4-DCA is a
2 shared metabolite of propanil, diuron, and linuron. Dr.
3 Gail Krowech had discussed biomonitoring 3,4-DCA in her
4 talk at the SGP meeting in August 2013. I didn't find any
5 new studies on biomonitoring 3,4-DCA, and I didn't find
6 any biomonitoring studies on other example anilide
7 pesticides.

8 There is no current lab capability for the
9 anilide pesticides I've just been discussing. However, a
10 separate method for the anti-microbial chemical
11 triclocarban, which also has an aniline substructure, has
12 been developed by EHL.

13 --o0o--

14 DR. IYER: Okay. That brings me to a close on my
15 overview of these three possible pesticide classes we've
16 researched. I have some options for the Panel listed on
17 this slide. The SGP could request that OEHHA prepare a
18 potential designated chemical document on one of these
19 pesticide classes. Additional classes could be considered
20 later. The Panel could propose further screening or
21 continued tracking of one or more of these pesticide
22 classes, advise no further action, suggest other pesticide
23 classes for possible consideration.

24 Thanks. And I'd be happy to take any clarifying
25 questions.

1 (Applause.)

2 CHAIRPERSON BRADMAN: Dr. Bartell.

3 PANEL MEMBER BARTELL: Yeah. Is it possible that
4 we request that OEHHA prepare more than one as a
5 designated chemical for next year? Is that an option?
6 I'm just curious why it's only listed as choose one --

7 (Laughter.)

8 PANEL MEMBER BARTELL: -- of the above.

9 MS. HOOVER: This is Sara Hoover. You can
10 probably guess why we're asking you to choose one. The
11 last time when we screened four, the answer was do all
12 four. And now since we're deciding to look at classes, we
13 want to, you know, thoroughly, basically, whenever we do a
14 potential designated document, it's a very extensive
15 undertaking.

16 PANEL MEMBER BARTELL: Sure.

17 MS. HOOVER: And so we want to start with your
18 highest priority. We're not excluding doing the others
19 certainly, but we want you to say which would be your
20 highest priority for 2017.

21 PANEL MEMBER BARTELL: Gotcha. Thanks.

22 CHAIRPERSON BRADMAN: Also, I just want to kind
23 of outline, we have an hour now between --

24 MS. HOOVER: Finish clarifying questions.

25 CHAIRPERSON BRADMAN: Yeah. But just to mention,

1 there will be lots of time for discussion after this.

2 PANEL MEMBER CRANOR: I'm going to have to leave
3 in a few minutes, but it seemed to me as you went through
4 those that the organophosphorus pesticides satisfied
5 multiple considerations for considering them as a class,
6 is that correct? They're fairly toxic. You have tests
7 for them. You have -- you can find them in human bodies.
8 You have -- you can run them through your machines and
9 identify them and so forth. It seemed to me it was fairly
10 clear that they satisfied more than one of your criteria.

11 DR. IYER: I think each of the classes satisfied
12 a couple of the considerations, but I think part of
13 today's discussion will be, you know, hearing more
14 information from the Panel and the public on, you know,
15 which of the classes would be most interesting to folks.

16 CHAIRPERSON BRADMAN: Dr. Fiehn.

17 PANEL MEMBER FIEHN: Yeah. You said one of the
18 those criteria also that adding any of those metabolites
19 or the classes of pesticides into the current panels of
20 compounds, or compound classes that can be followed,
21 should have, if possible, incremental costs to it. And
22 so, for example, dichloroaniline seems to be like a good
23 candidate, because it would -- it will be a common
24 metabolite of several chemicals, so that it could, you
25 know, balance out the different uses of different

1 chemicals in that pesticide class.

2 The question is, do we have any other examples of
3 compounds, metabolites, or other types of features that
4 could be relatively inexpensively added, so that we can
5 get a good idea about use of these chemical classes,
6 rather than very specific individual compounds.

7 DR. IYER: Yeah. I think this might be a good
8 question for the labs. I personally don't know about the
9 costs.

10 MS. HOOVER: I want to -- yeah, you don't have to
11 answer quite yet, Jianwen. I don't want to put you on the
12 spot. Basically, yes, that will be a consideration. I
13 want to mention that we showed the criteria for designated
14 chemicals kind of to frame like what we would consider and
15 what we would really delve into. We have been in touch
16 with the labs. We've been sharing the papers we have, but
17 they haven't actually examined like of those classes which
18 would be the easiest. We've talked about it, and
19 certainly Jianwen has thought about it, but -- and
20 obviously, we have a panel as Jianwen mentioned. We have
21 a panel for OPs already, DAPs and some specific
22 metabolites.

23 We have a new method for triclocarban, which has
24 an anilide substructure. So this is something we would
25 pursue further. So that's just a little intro, but you

1 want to add to that Jianwen?

2 DR. SHE: Yeah. I'll be honest, I don't think I
3 have to go through all of the method. But I look at this
4 method, it look like generally to be sensitive enough.
5 Most of the chemicals we needed to look at the population
6 levels. I think majority of them are at a 0.1 ppb. So
7 the method needs to be sensitive enough.

8 And then some of the chemicals are very polar, so
9 the method they use, because the current analytical
10 technology have some trouble with this polar compound,
11 especially like ES, ESI, LC-MS measure its effect. So the
12 technology people use is standard addition isotope
13 dilution, which have a benefit. You don't have the matrix
14 effect, because each calibration is by sample itself. But
15 it's own limitation you cannot do larger level study.

16 So I think a good -- the question from Professor
17 Fiehn is can we find a class biomarker? That's like Dr.
18 Asa Bradman talked about. You'll find the class biomarker
19 for like DAPs. That's a class biomarker to look for all
20 of them, or if there's something we need to think, because
21 I have no knowledge.

22 But right now, I think another approach that I
23 mentioned briefly before, can we have a comprehensive
24 method that looks through all of this
25 phosphorous-containing compound, which include OPFR, DAPs,

1 and specific metabolite, and then newer ones. This is all
2 in the exploratory stage. I think after the Panel give us
3 clean direction, we will do more research.

4 PANEL MEMBER FIEHN: Okay.

5 PANEL MEMBER LUDERER: You know, thanks for that
6 presentation. You know, one of the things that seems to
7 me to really jump out of the tables that you gave us, you
8 know, which was presented was for a number of these
9 pesticides, and particularly for some of the ones that
10 seem to be -- that have very high usages like glyphosate,
11 the pounds applied in California in 2014 is much, much
12 less than the pounds sold that same year. And so one
13 immediately wonders, well, does this have to do with
14 non-agricultural uses?

15 Do you -- and that's true for some of the other
16 ones too. So like the glufosinate-ammonium, and the
17 propanil, I think, is another one. Do you have a sense of
18 that? Is that what you think is going on? Do you know?

19 DR. IYER: Yeah. Well, I remarked on that one in
20 my talk in particular with the, you know, products that
21 are available for purchase, because you can check to see
22 what are the products that are registered for use in
23 California. I -- so where I noted that like for
24 glyphosate, dinotefuran, for example, I pointed it out.
25 Some of the others were less clear.

1 MS. HOOVER: Just to follow up, I think what
2 you're asking is, is that an indicator --

3 PANEL MEMBER LUDERER: Yes.

4 MS. HOOVER: -- that there's high -- yes, that's
5 how we're interpreting it. And we actually had some
6 really great consultations with DPR ahead of this, and DPR
7 is here actually representing us and listening. But
8 the -- you know, the use data, the PUR, is really solid
9 data. The sales data is a voluntary reporting system, so
10 it's -- you know, they can't really say for sure, you
11 know, how good that is. But I don't know, did you want to
12 say anything more or if that covers it?

13 DR. DuTEAUX: Shelley DuTeaux, Human Health
14 Assessment Branch, Department of Pesticide Regulation.

15 The sales data are voluntary and people are
16 allowed to report when they want to. And essentially, we
17 don't have a good tracking mechanism for on-line sales as
18 well. We're working with two major on-line retailers to
19 capture their sales. But you can't even correlate the use
20 data with the sales data. And the sales data might be a
21 good point in time indicator, but lots of folks buy in
22 bulk when the market is good. They'll store it. They'll
23 use it the following year, because it's still good. So
24 it's really hard to use those data as exposure or any
25 other kind of data.

1 MS. HOOVER: Yeah. I'll just -- thank you for
2 pointing that out, because we did notice that actually.
3 So when we -- when Shoba was mentioning that there seems
4 to be more consumer use, that was because we verified
5 there were products like that available. There were a
6 couple spots where there was discrepancies like that, and
7 there wasn't -- there aren't home products. So I think,
8 you know, that explains it. The data you can't just --
9 you track the data that way.

10 PANEL MEMBER LUDERER: But, I mean, just to
11 follow-up. I think some of the ones where the differences
12 are the most striking are ones where there is home use.

13 MS. HOOVER: I think so.

14 PANEL MEMBER LUDERER: That's what it looked like
15 to me.

16 MS. HOOVER: Yeah.

17 PANEL MEMBER BARTELL: One more clarification
18 question. On Slide 5, which was very helpful where you
19 showed the criteria for recommending the designated
20 chemicals, these are general criteria for specific
21 chemicals. There's no different criteria for thinking
22 about a designated class of chemicals, is that correct?

23 DR. IYER: That is correct.

24 PANEL MEMBER BARTELL: Okay. Thank you.

25 CHAIRPERSON BRADMAN: Are there any more

1 clarifying questions?

2 Well, right now we have budgeted a fairly good
3 chunk of time to discuss issues related to the first --
4 really all of these talks, and coming up with some
5 suggestions from the Panel to OEHHA in terms of evaluating
6 some of the pesticides we've talked about.

7 I thought now would actually be a good time for
8 some public input. And there are a number of requests
9 right now. I don't know if we have any -- Amy, do we have
10 an email requests?

11 MS. DUNN: There is one that came in early on, so
12 maybe you could --

13 CHAIRPERSON BRADMAN: Okay. Why don't we -- how
14 about if we start with the in-person, and then we will
15 make sure we get the email comment read into the record.

16 But right now, we have a comment from Rachel
17 Kubiak from the Western Plant Health Association.

18 MS. KUBIAK: Hi. This Rachel Kubiak, Western
19 Plant Health Association. Thank you for having me. It's
20 been a while since I've been here. I forgot that was 2013
21 when we first started talking about this group.

22 I guess my comments, just sort of general
23 comments. I don't want to go into -- this is a -- this is
24 a scientific discussion, and I don't want to get into the
25 back and forth with the 2014 report. I think some of the

1 statements that were made during that presentation were
2 misstatements or misguided.

3 In particular, I mean, I recognize -- let me just
4 first say, I completely recognize the passion, and the
5 emotion, and the feeling behind this. As someone who is a
6 mom and has children, small children, who lives in an
7 agricultural area, whose children go to school in an
8 agricultural area, I completely understand the concern in
9 that area. Especially for people who don't live in my
10 world who have worked in this field for 15 years, and
11 previously, and have worked in all sides of the spectrum
12 in the environmental world, as a regulator for Department
13 of Pesticide for many, many years, and now on the industry
14 side, I think that it's evident that we don't do a good
15 enough job of getting out information to people who don't
16 live in our world, and it's a scary subject. And I
17 completely understand that.

18 But having said that, I think there were some
19 things, just for clarification, that I think need to be
20 made. Number one, again, recognizing if we had unlimited
21 resources or the Department of Pesticide did things such
22 as -- you know, that the Pesticide Use Reporting that DPR
23 has is probably the most complex and best in the entire
24 world. So I appreciate the information that we have here
25 in California, especially as someone who works, not only

1 in this State but two other states. What we have in this
2 State is amazing.

3 Can it be better? It always can be better. But
4 I recognize that there's limitations and there's reasons
5 behind why that system is as good as it is.

6 I guess I'll pretty much leave it at that for
7 that particular presentation. Although, I might suggest
8 in the future that having some folks here. Appreciate
9 that Shelley is here now. I know Jay Schreider used to be
10 involved back in the day, and many of you know him, who
11 since retired. But having some folks here from Department
12 of Pesticide, because this issue is complicated, and we're
13 talking about use, and we're talking about toxicity, and
14 we're talking about other things, I think it would be
15 beneficial to have maybe folks -- different folks from
16 within that Department to be able to speak to those
17 different things, because within the Department people
18 work on different areas. So just as a suggestion going
19 forward, that might be something to be of use to this
20 Panel to get a different perspective of that.

21 And then I guess the only other point that I
22 would make just out of fairness or clarity with respect to
23 glyphosate, that, yes, it has been listed by IARC, but I
24 think that in terms of it being a probable carcinogen is
25 debated in the scientific community, it's been found by

1 pretty much all other world organizations to not be a
2 carcinogen. So I just wanted to make note of that, and I
3 think I'll leave it at that.

4 Thank you.

5 CHAIRPERSON BRADMAN: Yeah.

6 DR. ENGLISH: Yeah. Hi. This is Paul English,
7 Department of Public Health. I would just -- from the
8 last commenter, I would just like her to please point out
9 what comments she felt were either misguided or
10 inaccurate. This was just part of a pattern from the
11 response from this report. There were accusations in the
12 media that the report was flawed, scientifically
13 inaccurate. And nothing has ever been shown to be true
14 that these commenters have said.

15 So if the previous speaker wants to accuse my
16 talk of being inaccurate or misguided, I wish she would
17 please say specifically what points she's referring to.

18 MS. KUBIAK: Certainly, we can talk about this
19 afterward, but in essence of time, I don't think we
20 necessarily need to get into specifics on that.

21 DR. ENGLISH: Okay. Well, then I would recommend
22 in a public forum not to say things are inaccurate unless
23 you can back them up.

24 MS. KUBIAK: Well, I don't think we have
25 appropriate time.

1 CHAIRPERSON BRADMAN: Okay. Well --

2 MS. HOOVER: Hi. This is Sara Hoover. I just
3 wanted to respond to your suggestion about having more
4 people from DPR. So we actually had a really robust
5 consultation process. Jay was our go-to guy before. But
6 very fortunately, I've been in touch with Shelley now and
7 Marylou. And there's actually I believe a whole room full
8 of DPR people listening to the webcast.

9 DR. DuTEAUX: Hi, everyone.

10 MS. HOOVER: So it's been actually a really great
11 opportunity for us to reconnect with DPR at a different
12 level, and it's been a really positive process. So they
13 were definitely all invited and I think there's a lot of
14 people listening on the webinar.

15 CHAIRPERSON BRADMAN: So we'll move on to the
16 next public comment, but I think this kind of discussion
17 really reflects kind of the complex issues around
18 pesticides, both as important tools for producing food and
19 fiber and other resources. They're also important for
20 public health protection, and we use them for mosquito
21 control, mosquito abatement, and other settings.

22 And, you know, I think this is one of the
23 challenging issues with this. But for the Biomonitoring
24 Program, you know, really our goal is to understand what
25 exposures are. And we're not making judgments about

1 regulation. And so I just want to kind of put that out
2 there. And I think it's really important that we get
3 input from, you know, all perspectives on these issues.

4 Our next public commenter is Emily Marquez from
5 the Pesticide Action Network.

6 MS. MARQUEZ: Thank you for the presentations
7 today. They were really interesting.

8 Hello. Okay. Hi. So I think for the
9 biomonitoring work, the groups that we -- PAN was most
10 interested in finding more about ex- -- or finding out
11 more about exposure. Dr. Quintana mentioned one, which
12 was children either living near schools or living in the
13 neighborhoods where the -- around the schools or doing the
14 biomonitoring based on where they attend school.

15 Another group that would be of interest is
16 farmworkers working with some of the priority pesticides
17 named in the DPH report, or named by DPH. And then the
18 other thing I was curious about was whether or not there
19 was interest in doing biomonitoring in the areas where the
20 air monitors are located. So Rio Mesa High School is one
21 of those sites that Dr. English, I think, showed in his
22 presentation, and could be a really -- possibly a really
23 good place to do biomonitoring of the high school students
24 attending.

25 And then the other thing I was curious about was

1 whether or not there was a possibility of using those
2 silicone exposure bracelets in conjunction with doing, you
3 know, urinary biomonitoring -- or urine biomonitoring to
4 see if there is correlations between the silicon
5 bracelets. I don't know that much about those bracelets,
6 but I know that they're definitely of interest, because
7 they're relative -- or much more non-invasive and, in some
8 ways, make some of the work easier possibly.

9 So, thanks.

10 CHAIRPERSON BRADMAN: Thank you for that comment.
11 Just to respond to one thing about the bracelets, we
12 actually have a study in the field right now, probably as
13 we speak using those bracelets, and we're also collecting
14 urine samples. These are in Latina teenagers. We don't
15 have money for urinary metabolite analyses at this point,
16 but we do have -- we are going to -- this is really our
17 first chance to use those bracelets for pesticides.
18 They've been used for other chemicals. I'll be curious to
19 see how that turns out.

20 Next public speaker is Veena Singla from the
21 Natural Resources Defense Council.

22 DR. SINGLA: Good afternoon. Veena Singla with
23 the Natural Resources Defense Council. Thanks so much for
24 a very interesting day of presentations. And so I had a
25 couple comments. One of my comments is in relation to the

1 morning's discussion about the funding augmentation to
2 focus on environmental justice projects. And my
3 organization, the Natural Resources Defense Council, along
4 with the Breast Cancer Fund was one of the groups to help
5 advocate for that funding augmentation.

6 And I wanted to highlight the diverse range of
7 organizations that were in support of that funding
8 augmentation, representing kind of a cross section of
9 advocacy, health, labor, and environmental justice groups.
10 So I have here a copy of the letter that we submitted in
11 support of the funding augmentation. And I'll just read
12 off some of the groups that were in support, and we do
13 have copies of the letter to share with the Panel as well.

14 So - Black Women for Wellness, Breast Cancer
15 Fund, California Environmental Justice Alliance,
16 California Healthy Nail Salon Collaborative, California
17 League of Conservation Voters, Californians for a Healthy
18 and Green Economy, Californians for Pesticide Reform,
19 Clean Water Action, Coalition for Clean Air, Communication
20 Workers of America District 9, Natural Resources Defense
21 Council, Physicians for Social Responsibility L.A. and San
22 Francisco, USW Local 675, Worksafe, American Cancer
23 Society Action Network, Comite Civico Del Valle,
24 Environment California, Commonweal Biomonitoring Resource
25 Center, Friends of the Earth, Pesticide Action Network,

1 and the United Fire Service Women.

2 So there really was broad support from the
3 community for the funding augmentation. And we're very
4 enthusiastic about the program moving forward looking at
5 projects -- these environmental justice new projects. And
6 I did want to echo one of the statements made earlier by
7 Dr. Schwarzman in terms of interest in looking at
8 pesticide biomonitoring, and, in particular, for the
9 organophosphate pesticides, which the Program has --
10 currently has capacity to monitor for.

11 So, you know, organophosphates, or OPs, are often
12 commented on as declining in use overall. However, they
13 do still represent the large majority of insecticide use
14 in California, as shown in Dr. Bradman's presentation.
15 And particular OPs can change in use, volume quite
16 significantly. So, for example, chlorpyrifos had a 32
17 percent increase in use in 2013 in California. And it's
18 applied annually at over a million pounds. It was one of
19 the top pesticides used near public schools as well.

20 And as Dr. Bradman highlighted, OPs are linked to
21 serious health concerns, both in relation to prenatal and
22 postnatal exposures. And it's low-income minority
23 communities that are disproportionately impacted by these
24 agricultural pesticides, agricultural communities,
25 farmworkers, and their families.

1 So I did want to highlight what I think is an
2 opportunity for studies looking more at children's OP
3 pesticide exposure. And also, I wanted to comment on the
4 organophosphorus pesticide class as potential designated
5 chemicals, and do agree that they meet many of the
6 criteria for listing and would strongly support that class
7 for listing as designated chemicals.

8 Thank you.

9 CHAIRPERSON BRADMAN: Thank you for that comment.
10 And then we have our last comment from Nancy Buermeyer
11 from the Breast Cancer Fund. And then I want to bring the
12 conversation back to the Panel for discussion related to
13 the Program goals. Oh, excuse me, and after the email.

14 So, Nancy, thank you.

15 MS. BUERMEYER: Sure. Just really briefly, I
16 just wanted to echo a lot of what my colleague Veena said
17 around the OP as a class. It's one of particular concern
18 to us, because of its link to breast cancer. And as the
19 Panel has discovered, as the presentation said, it does
20 check off a lot of the boxes around the criteria for
21 listing as a class for designated chemicals. And we've
22 always been in favor of class listings, so that it
23 provides that flexibility for the Program to keep up with
24 the industry as they move the shells around, and move from
25 one chemical to another.

1 And so we would strongly urge the Panel to
2 consider further investigation of listing those OPs as a
3 class.

4 Thank you.

5 CHAIRPERSON BRADMAN: So I think we have the
6 email comment.

7 MS. DUNN: This is a comment from James Nakashima
8 of the Pesticide Epidemiology Section of the Office of
9 Environmental Health Hazard Assessment.

10 He writes, "In the early comments that followed
11 Robin Christensen's talk, others have addressed the
12 potential for coordinating environmental justice studies
13 with either existing studies or future studies. I'd just
14 like to add that the ongoing combined DPR and ARB ambient
15 air monitoring program is being expanded in 2017 to cover
16 eight sites. Environmental justice considerations were
17 part of the revised sample site selection process. Sample
18 analytes include both fumigants as well as more than 30
19 semi-volatile conventional pesticides. Biomonitoring
20 efforts that include the people nearby these ambient
21 monitoring sites might provide a unique opportunity to
22 gather additional exposure data from populations in high
23 pesticide use regions."

24 CHAIRPERSON BRADMAN: Okay. Thank you. Well, at
25 this point, I think we've had some excellent public input,

1 and now we have some time for some Panel discussion. And
2 there will be more opportunity for public comment. And I
3 think part of the -- really the format here can include
4 discussion that includes input from, you know, not just
5 the Panel but other people here.

6 So I want to bring it back. It might be helpful
7 if we put up the slide -- Shoba's slide on the options for
8 the Panel for discussion. I don't know if we can --

9 MS. HOOVER: I was thinking maybe we could
10 actually start with your slide where you talked about
11 considerations in biomonitoring pesticides, because we
12 still have some more time.

13 CHAIRPERSON BRADMAN: Sure.

14 MS. HOOVER: And we thought we could get some
15 general input on, you know, strategies --

16 CHAIRPERSON BRADMAN: Sure. Okay.

17 MS. HOOVER: -- before we get into the specifics
18 of just those options.

19 CHAIRPERSON BRADMAN: Sure.

20 MS. HOOVER: And while we're putting that one up
21 -- that's Asa's talk. It's like -- I think it's his
22 last -- your last slide before the end.

23 CHAIRPERSON BRADMAN: Yeah, near the end.

24 MS. HOOVER: Yeah. So that would be a good
25 framing for this. I also wanted to mention, for those

1 listening and for those in the audience, that when Veena
2 mentioned she'll be giving copies of the letter to the
3 Panel, that means we'll also be posting it on our website.
4 So that will be available for anybody who wants to take a
5 look.

6 CHAIRPERSON BRADMAN: Are there any general
7 discussion comments or thoughts from the Panel right now?

8 PANEL MEMBER LUDERER: I'll say something. So
9 we've already -- I think, several people have commented
10 that all three of these potential designated classes meet
11 multiple of the criteria that we have for designating
12 chemicals or classes. And so, you know, I've just been
13 trying to think of what -- you know, what are some of the
14 things that we might try to use to sort of rank these.

15 And the one -- and one that I think was already
16 mentioned by several people is the looking at the -- you
17 know in terms of pounds applied and pounds sold, the
18 organophosphorus group certainly is the highest. It seems
19 to be. You know, and in looking at the -- and another
20 thing we might consider is trends in use over time. And
21 as was just mentioned, there's -- it's been said that
22 organophosphates, at least, that the use has been
23 declining. But certainly the graphs that were presented
24 in the presentation for the organophosphorus group as a
25 whole, some of those really have been increasing in recent

1 years as well. So there's not a decline in all of the
2 potential -- the members of that potential class.

3 And on the other hand, if we are interested in
4 emerging chemicals, and things that may be increasing on
5 the horizon over time, if we look at the neonicotinoids,
6 we know that those -- those, there were almost -- there
7 was almost no use until maybe around 2000 looking at some
8 of those graphs. So although the absolute amounts are
9 lower, the -- there's definitely a trend of increasing use
10 over time. Although, we know that there's been regulatory
11 action on those compounds in other parts of the world as
12 well.

13 So those are just some thoughts in trying to
14 think about how we -- you know, might want to go about,
15 you know, trying to rank these, since we're asked to
16 choose one.

17 CHAIRPERSON BRADMAN: Any other comments or
18 discussion from the Panel?

19 Dr. Quintana.

20 PANEL MEMBER QUINTANA: So to get back to my
21 colleague's point, are there methodological considerations
22 or costs which kind of jump out at the people who have to
23 actually do this? Do they have any comments on that piece
24 of it?

25 MS. HOOVER: I think I'll just say a couple

1 things here. This is Sara Hoover again. One, just to
2 make sure everybody is clear, we're not -- you know, as
3 Dr. Luderer said, we're just deciding which we would look
4 into in more detail as potential designated chemicals. So
5 some of those questions will be answered once we delve
6 into the class itself.

7 I think that Jianwen earlier mentioned that, you
8 know, obviously with organophosphorus, we have a lot of
9 experience with that set of -- that class of compounds.
10 So that's just a fact to consider, you know, in terms of
11 analytical capability.

12 But as I mentioned, you know, they just developed
13 a method for triclocarban, which is an analyte. I did
14 want to circle back too to a comment by Dr. Fiehn earlier,
15 which was about 3,4-DCA. So that was something that
16 actually came up years ago from the Panel looking at
17 pesticides or chemicals metabolized to 3,4-DCA. And so
18 we -- you know, Dr. Krowech had looked at that earlier in
19 2013. Shoba looked at it again. Basically, so far, and
20 correct me if I'm wrong, Shoba, but what we were finding
21 is the most prominent chemicals like that were propanil,
22 diuron, and linuron. I wasn't able to locate -- I did
23 some research again, preliminary research, trying to find,
24 well, maybe this would be an interesting class.

25 But what we found -- am I on the right track

1 here?

2 DR. IYER: Yes.

3 MS. HOOVER: What we found is that, well, diuron
4 and linuron are already on our list. Propanil is not, but
5 we can't find other similar chemicals. So that was sort
6 of an interesting feature that came out of delving more
7 into trying to define a class. And we had looked at the
8 broader group of anilides, but they're related in terms of
9 that anilide substructure. But there's quite a bit of
10 differences you know -- and Dr. Fiehn is shaking his head
11 and nodding his head at the same time. So do you want to
12 follow up on that?

13 PANEL MEMBER FIEHN: Well, there's obviously, and
14 we have discussed it before, for some chlorinate -- some
15 clear chlorinated, and they're relatively easy to find,
16 based on their patterns. You know, similar to your DCA
17 where, you know, it has a certain pattern so to say. And
18 others have not these types of patterns.

19 So therefore, I think some of them might be a
20 little easier to find as a pattern so to say and others
21 might be more difficult, just, you know, saying that.

22 And I think we can conclude by your answers right
23 now that there is no judgment that, you know, from the
24 analytical side or the literature survey side would give
25 us indication of one or the other classes to prioritize.

1 But I find it interesting that we were asked to
2 do this prioritization today. And we usually are
3 reluctant because we find them all important.

4 (Laughter.)

5 CHAIRPERSON BRADMAN: I think that's true.
6 And --

7 (Laughter.)

8 CHAIRPERSON BRADMAN: -- one of the challenges
9 with pesticides, I mean, they're designed -- they're
10 poisons. I mean, they're designed to be poisonous. So
11 we're going to have issues with toxicity as a matter of
12 course.

13 I mean, the question is at the exposures we might
14 see, you know, are they really a hazard? And certainly,
15 you know, they're tools in our economy, but we don't
16 really know, and they've gone through a risk assessment
17 process to get registered, but we have found with a lot of
18 pesticides that despite that risk assessment process and
19 registration process, post hoc, we've done studies that
20 have raised concerns, and therefore changed the
21 registration status of pesticides.

22 And I think in a way what we're doing here is
23 we're kind of doing a post hoc evaluation. And the
24 important thing is that to really understand what the
25 risks are, we need to understand what the exposures are.

1 And to understand the exposures, we need to do some
2 biomonitoring.

3 I know I have personal opinions about this, and
4 you know, I would tend to prioritize -- you know, I think
5 it's important to look at glyphosate and the groups that
6 that comes with. I'm really interested in the
7 neonicotinoids and other insecticides that are used
8 heavily indoors, and as we see, also have increasing
9 agricultural use, and partly because we know so little
10 about exposures to those compounds in California.

11 But I think that's just a challenge here, and
12 that we need to come up with either some criteria that's
13 either judgment based or data based to try to, you know,
14 make suggestions on how much work we want the Program to
15 do evaluating these, because everything we suggest or
16 recommend creates work for people. And we need to be
17 conscious of that when we -- resources are in limited
18 supply.

19 MS. DUNN: We have another comment that's come
20 in.

21 CHAIRPERSON BRADMAN: Okay.

22 MS. DUNN: Okay. This is from a DPR staff member
23 Puttappa Dodmane.

24 "It is important, it seems to be, that the OPs
25 that are increasing in use are not cholinesterase

1 inhibitors. The criterion of increasing use over time
2 seems to deserve a lot of weight, but let's not lump
3 apples and oranges."

4 CHAIRPERSON BRADMAN: Dr. Schwarzman.

5 PANEL MEMBER SCHWARZMAN: I wanted to pick up
6 kind of on where you were just now, and Dr. Luderer's
7 earlier point about the gap on some of the
8 organophosphorus compounds like glyphosate between the
9 applied numbers and the sales numbers, which at least, in
10 the case of glyphosate, seems may be because of consumer
11 use, as opposed to agricultural application. And, to me,
12 that's a very interesting point, especially because it's
13 happening at such high volumes.

14 And it -- sort of getting to Dr. Bradman's point
15 about how can we best apply the biomonitoring resources,
16 that is, what questions really need biomonitoring to be
17 answered? That's one indicator to me of a place where
18 biomonitoring information could be very illustrative,
19 because we don't understand the use information very well.

20 And potentially, there are -- because of that
21 consumer use segment, or what we're guessing consumer use,
22 there may be exposures that are much larger than what we
23 would estimate based on the better data that we have for
24 agricultural application.

25 I'm going a little bit beyond my own personal

1 understanding. So certainly speak up if I'm -- if that's
2 not accurate. But based on the information that's been
3 presented here and other stuff that I've read, I would
4 favor -- to me, that tips the scale a little bit in
5 otherwise very merited classes here in getting some
6 understanding of what's happening about exposure to
7 organophosphorus compounds where there's such high
8 volumes, but also such potentially poorly understood use.

9 CHAIRPERSON BRADMAN: I thought that was a very
10 helpful comment.

11 (Laughter.)

12 CHAIRPERSON BRADMAN: Yeah. Any other comments
13 from the Panel or discussion?

14 PANEL MEMBER BARTELL: Sure.

15 CHAIRPERSON BRADMAN: Dr. Bartell.

16 PANEL MEMBER BARTELL: It strikes me, you know,
17 we've circled around this a couple times, the idea of
18 what -- by what criteria we might actually make this
19 recommendation or which class? And, you know, the use of
20 production figures --

21 MS. HOOVER: Can you turn?

22 PANEL MEMBER BARTELL: Oh, sorry, yeah. And the
23 use and production figures are probably one important
24 criteria we might use. I think another thing we might
25 think about is relative toxicity, which I know is a

1 difficult thing to think about when you're thinking about
2 entire classes of chemicals.

3 And I'm just wondering if, you know, maybe the
4 toxicologists on the Panel have any advice, or in the
5 audience any advice, on -- and I don't know if it's even
6 possible to generalize in a way to say, you know, one
7 class is probably more potent than another class in terms
8 of toxicity. But I guess that's an open question, if
9 anybody has anything to contribute to that.

10 CALEPA DEPUTY DIRECTOR SOLOMON: If I may?

11 CHAIRPERSON BRADMAN: Yes, absolutely.

12 CALEPA DEPUTY DIRECTOR SOLOMON: Gina Solomon,
13 CalePA. I actually -- it is a little tricky to address
14 that question, because of the widely varying toxicity
15 within each of these classes. And the fact that some of
16 the more toxic among the organophosphorus are already on
17 the list. So that sort of means that the remainder are
18 maybe sort of similar, I would say, overall.

19 But one of the things that I was sort of hoping
20 to mention since Tom McKone was unable to make this
21 meeting, I was sort of hoping to channel him, because he's
22 published a fair amount on this question of how much of
23 any given chemical that's out there in the environment
24 actually gets into people. And he has stated at previous
25 Panel meetings, made this point, you know, that things

1 that are used indoors are far more likely to get into
2 people's bodies, molecule for molecule, than something
3 that's used, you know, in outdoor uses.

4 And so, you know, not to say that that should be
5 the determining factor, but I think, you know, I've heard
6 several of you speak about this -- you know, the indoor
7 uses and the consumer uses being kind of important. But
8 that actually is related to several different classes
9 here, because there are consumer uses of several of these.
10 But, you know, some of the pet uses are of particular
11 interest perhaps from a pediatric perspective.

12 But I think you can make a good argument either
13 way. But I think that that exposure issue might be
14 important in terms of the likelihood of detecting
15 something.

16 DR. DiBARTOLOMEIS: Hi. As one of the
17 toxicologists in the audience - Michael - I want to muddy
18 the waters a little bit more on that question about the
19 toxicity of chemical.

20 PANEL MEMBER BARTELL: Sure.

21 DR. DiBARTOLOMEIS: We cannot forget that we are
22 not exposed to these chemicals one at a time, which is
23 really how they're evaluated in a toxicology study, and
24 even in the risk assessment. So you can't -- I don't
25 think you can actually start playing that game of which is

1 more potent from the others, because it's more than likely
2 you're getting exposed to chemicals in all these classes
3 at the same time. We don't know that, but, you know,
4 that's why biomonitoring would be really helpful.

5 And so I -- I guess I would try to steer away
6 from that being one of the criteria you use. Exposure is
7 still probably the best for you to think about, but I
8 wouldn't rule out a pesticide that has much lower amounts
9 of usage right now if it's starting to increase.

10 I'm not trying to sway you. But, you know,
11 again, individual chemical toxicity versus mixtures and
12 how people are really exposed, you'll get into a real mess
13 if you start trying to do that kind of incremental
14 comparison.

15 MS. HOOVER: Asa.

16 MS. DUNN: There's another public comment.

17 CHAIRPERSON BRADMAN: Thank you.

18 MS. DUNN: Again from the DPR staff person we
19 heard from earlier, who says "Good point about the gap
20 between use and sales, but isn't that also true for
21 neonics, not just glyphosate? And we still feel that
22 glyphosate is not really an OP in regards to hazard, even
23 if basic chemical structure is comparable."

24 MS. HOOVER: I just want to make a clarification
25 to that. This is actually an interesting point that we've

1 encountered in a number of discussions. And I think --
2 and actually, some of the things that Michael was just
3 talking about is another important consideration. And we
4 are not calling glyphosate an OP. An OP is typically the
5 abbreviation for organophosphate, and organophosphate has
6 a specific structure and specific characteristics, many
7 are cholinesterase inhibitors.

8 No, glyphosate is not an OP classically defined
9 as an organophosphate. We intentionally did a broader
10 structure-based definition is not organophosphate. It's
11 an organophosphorus, which just means it's a
12 phosphorus-containing or organic compound used as a
13 pesticide. We did that intentionally. Why did we do it
14 that way? Because what we're dealing with here is a
15 lab-based program. And so, as again Jianwen has pointed
16 to, this commonality of structure can be very helpful.

17 Now, you know, maybe glyphosate would have to be
18 a completely different method. We're not claiming that we
19 could do like one lab method, but the idea is to try to
20 grab as many similar compounds in one class as possible.
21 And that was the reason why we designed organophosphorus.
22 So just clarification on that last comment.

23 CHAIRPERSON BRADMAN: I should know. From my
24 understanding, the lab issues with glyphosate, it often
25 requires its own analysis. It's kind of complicated.

1 MS. HOOVER: Yeah, I mean, we -- as Shoba
2 mentioned in her talk, we actually had a phone meeting
3 with Axel Adams --

4 CHAIRPERSON BRADMAN: Oh, great.

5 MS. HOOVER: -- and he -- so he's in Roy Gerona's
6 lab at UCSF, and they -- he's a great resource. He's done
7 a lot of looking into all the difficulties with the
8 method. They developed a method for glyphosate. It was,
9 what, 93 percent detect. So they did, you know, voluntary
10 population, found 93 percent detect in the population.
11 They're developing the AMPA.

12 So, yeah, I think, as he said, it's a difficult
13 compound to measure, so not necessarily going to be in a
14 panel, but we're just looking at the broad class of
15 phosphorus-containing compounds.

16 CHAIRPERSON BRADMAN: Right. That's great.
17 Yeah. We're also giving -- Axel and Roy are taking 10 of
18 our samples just to do a pilot with to see what we find.
19 So maybe that will be a little bit informative.

20 Dr. Bartell.

21 PANEL MEMBER BARTELL: Yeah, I'll go again. So
22 was it the neonics that are then more used indoors? I'm
23 starting to be persuaded by this idea of paying more
24 attention to the indoor versus outdoor. Am I remembering
25 that correctly?

1 CHAIRPERSON BRADMAN: Yeah. The neonics have a
2 variety of uses. There's --

3 PANEL MEMBER BARTELL: Indoors and outdoors.

4 CHAIRPERSON BRADMAN: There's been increasing use
5 in agriculture as an insecticide. It's still small
6 relative to the total insecticide use, but it also has use
7 for structural pest control, termites and things like
8 that, foundation, treatments, crack -- foundation crack
9 treatment, and things like that. It's really replaced
10 chlorpyrifos for that.

11 And then it's also been used -- it's used in a
12 lot of pet products. I think Advantage or Frontline,
13 one -- some of the common spot-on treatments use
14 imidacloprid. So it's part of the, you know, general
15 group of neonicotinoids. It also shows up in some of
16 the -- for example, the structural pest control, PUR,
17 reporting databases. It came up for child care. That
18 data is pretty sparse right now in terms of its quality,
19 but there's going to be a big increase in that quality,
20 but it seems to show up in a lot of places. And it's --
21 imidacloprid, in particular, has been controversial,
22 because of issue around pollinators.

23 MS. HOOVER: Can I just pipe in here, too?

24 So I think you're struggling a little too hard
25 with the idea of I -- you know, the criteria and how do we

1 pick one. I'm not asking you to pick one permanently,
2 just pick one for 2017.

3 (Laughter.)

4 MS. HOOVER: So it's not like this is the end,
5 and we -- and, you know, this is a really helpful
6 discussion, and we can go back and start -- we're not
7 going to drop these classes. We're not going to shelve
8 them if you say choose this one.

9 So we'll look into it. You know, like anilides,
10 very interesting. There's a lot more we could learn about
11 anilides. I think one thing I want to just -- this idea
12 of neonics inside versus organophosphorus, you know,
13 glyphosate, for example, is super widely used. And I
14 think by, you know, Roundup. It's used at home. It's
15 very widely used.

16 So I think that one thing that Tom was saying is
17 does it get indoors? You know, and once it gets indoors,
18 it stays indoors. So if you're using it a lot and
19 tracking in it. I don't know anything about glyphosate
20 personally, but it was striking to me that in this
21 voluntary sample it was 93 percent detect. So that kind
22 of says, you know, something about exposure to me.

23 So I -- you know, again, I don't think you have
24 to be real strict with yourselves about how you give this
25 input.

1 CHAIRPERSON BRADMAN: Dr. Quintana.

2 PANEL MEMBER QUINTANA: I feel like I'm hearing
3 more support for the first two choices as presented than
4 the third one. Did we get that far that we want to --

5 (Laughter.)

6 PANEL MEMBER QUINTANA: But I do want bring it
7 back to also some of the public comment that we had. I
8 believe favoring the organophosphorus, which I find
9 swaying me to that direction.

10 PANEL MEMBER FIEHN: Yeah, I would second that.
11 You know, I would like to go that we would have a vote on
12 that, so that we -- I think we --

13 MS. HOOVER: Could you talk into the mic?

14 PANEL MEMBER FIEHN: I think we are ready to make
15 a vote. And I would like to see that we have in our
16 priorities like the OPs first, and then -- that doesn't
17 mean that the other classes are not important, right?

18 But I think both, in terms of public comments as
19 well as in users -- in total use, including indoor use,
20 including -- let's put it this way, public debate, a
21 disagreement in the scientific area, you know, there was a
22 lot of noise, as we have all known, but not only on OPs,
23 but also neonics, of course. But as I would like to tend
24 to say that we vote in favor of the OPs as being the
25 highest priority --

1 PANEL MEMBER QUINTANA: Phosphorus.

2 PANEL MEMBER FIEHN: Yeah --

3 (Laughter.)

4 PANEL MEMBER FIEHN: Okay, organophosphorus
5 compounds.

6 CHAIRPERSON BRADMAN: Should we make that as a
7 motion?

8 PANEL MEMBER FIEHN: Yeah, that's a motion.

9 MS. HOOVER: No need to vote. This is just
10 informal input --

11 CHAIRPERSON BRADMAN: Okay.

12 MS. HOOVER: -- so you can get a sense of the
13 Panel, and you can each have your own priorities, if you
14 want, and we'll take that into consideration.

15 PANEL MEMBER BARTELL: Could we have a little
16 more discussion of the indoor uses of organophosphorus
17 pesticides, like are there specific ones that are actually
18 applied indoors intentionally, that we know of?

19 PANEL MEMBER QUINTANA: I just want to answer
20 your comment by saying that it doesn't have to be applied
21 inside to end up inside.

22 PANEL MEMBER BARTELL: Sure.

23 PANEL MEMBER QUINTANA: In house dust, we can
24 find all these agricultural pesticides in house dust.
25 Just as a reminder that use inside shouldn't be the only

1 indicator, I think.

2 PANEL MEMBER BARTELL: Yeah, but if it's not
3 directly used inside, it's certainly less likely to show
4 up in the same quantities, right? I mean, there's
5 migration from dust, but you're not going to get probably
6 as large amounts indoors, if it's not actually like
7 directly sprayed inside or used inside, I would think, you
8 know, for most of these chemicals.

9 MS. HOOVER: Speak into the mic.

10 PANEL MEMBER BARTELL: Sorry. Yeah. No, I was
11 just commenting that I would think that, you know, whether
12 it's intentionally applied indoors or outdoors would still
13 affect the magnitude of exposure, I mean, from first
14 principles you would -- certainly, there is always going
15 to be migration of dust in the air inside, but you would
16 expect that, you know, things being sprayed directly in
17 the house, for example, and used and applied in the house,
18 you would have larger quantities than something sprayed
19 outside that migrates in through dust, depending on the
20 quantities.

21 PANEL MEMBER QUINTANA: Well, if you sprayed it
22 in equal amounts that would be true. Because if you use a
23 lot outside and only a little bit indoors, then I'm not
24 sure that's true.

25 PANEL MEMBER BARTELL: That's true. Yeah, it

1 could be.

2 PANEL MEMBER QUINTANA: And if it's a pet
3 application instead of spraying, it's another thing.

4 PANEL MEMBER BARTELL: Right. Okay.

5 PANEL MEMBER LUDERER: Yeah, that was going to be
6 my comment too. I think the pet applications are probably
7 in terms of the quantity used maybe quite a bit less than
8 say something that's used as an herbicide kind of broadly
9 around the garden. But again, it's just --

10 PANEL MEMBER BARTELL: Depending on how much
11 you're touching the pet that is touching the things in the
12 garden too.

13 PANEL MEMBER LUDERER: Well, in terms of it being
14 tracked in, I guess, as well. But, yeah, I think it's
15 very hard to know. It would be really nice to be able
16 to -- I mean, I agree that my vote would be for
17 organophosphorus, but neonicotinoids would be very close
18 behind, you know, for the reason that you said. And I
19 think we don't really know what the exposures are.

20 CHAIRPERSON BRADMAN: That's kind of how I feel.
21 I mean, since most of the organophosphate pesticides are
22 on our list within the organophosphorus compounds, I think
23 there's a lot of interest in glyphosate, both, you know,
24 just nationally and information on exposure. I think it
25 would contribute to the science and the understanding.

1 But I think the neonics are really important.

2 I know you're asking for one compound -- you
3 know, class to work on.

4 MS. HOOVER: That's okay.

5 (Laughter.)

6 MS. HOOVER: You can make it two.

7 CHAIRPERSON BRADMAN: We'll, I would prefer to
8 name two.

9 (Laughter.)

10 MS. HOOVER: That's fine.

11 CHAIRPERSON BRADMAN: Or I would name glyphosate
12 and the neonics.

13 PANEL MEMBER BARTELL: And that is actually an
14 option to seriously consider.

15 MS. HOOVER: Can you speak into your mic?

16 PANEL MEMBER BARTELL: Yeah. Sorry. I think
17 that is an option to seriously consider. You know, I
18 think we've all expressed interest in glyphosate. But,
19 you know, if there are already the other sort of high use,
20 high toxicity organophosphorus compounds, they're already
21 on the list, other than glyphosate, you know, it may be
22 advantageous to kind of consider both just specifically
23 picking that chemical, glyphosate, and then pursuing
24 another class.

25 I'm not necessarily opposed to, you know,

1 pursuing organophosphorus as a class of chemicals for the
2 next listing. It's just -- I think it's worth thinking a
3 little bit, are there -- you know, are there other
4 organophosphoruses on the rise in use, or is it really
5 just glyphosate that's kind of driving that use and that
6 interest in listing that as a new class right now.

7 MS. HOOVER: Can I say something?

8 CHAIRPERSON BRADMAN: Absolutely.

9 MS. HOOVER: We're looking at our charts right.
10 I will say that, yes and no. I mean, I think that, for
11 example, there was a really big increase in glufosinate
12 that -- and that's why it came onto our radar, then it
13 dropped. However, Axel Adams actually told Shoba and I
14 with all this research that they're developing now
15 co-resistant crops, you know, so it's glufosinate and
16 glyphosate.

17 And so I'm -- we're speculating that maybe in
18 the -- you know, it started to go up again, a little bit
19 glufosinate. So I guess -- and I'm going to make a -- you
20 know, I'll make a pro-classes kind of argument. This is
21 some -- this is work that Gail Krowech and I started
22 developing in 2008, and with colleagues, other colleagues,
23 Laurel and Martha Sandy -- Laurel Plummer, Martha Sandy,
24 Lauren Zeise, and Gina Solomon. And we just heard today
25 that our paper describing the class approach has been

1 accepted by EHP, so it should be published soon.

2 And I think we've seen so many times that if you
3 target one, you know, and we do all the work -- this is a
4 lab-based program. We're not talking about Prop 65
5 listing. We're talking about -- it's not a regulatory
6 situation. It's allowing us to be able to look for these
7 chemicals.

8 So if we target one, and then -- we were very
9 surprised when Shoba updated the research on glufosinate.
10 It was about, you know, what a year or two after Gail did
11 her talk, and it just plummeted. You know, so we could
12 have -- we all would have thought, wow, this is a really
13 good important one. Let's do this one.

14 And now, you know, it's down again, but now it's
15 increasing again. So I think we've seen this so many
16 times that there's real value in trying to say, okay, you
17 know, is this group of interest, let's do the group. And
18 we don't have to -- you know, I think -- I actually -- I
19 came from Proposition 65. I was very used to the very
20 high standards to putting something on a list. And again,
21 this is a -- it's kind of a list of analytes. That's what
22 we're creating, a list of analytes that we can look for,
23 and having the flexibility to be able to look for, you
24 know, and shift what's important, what's important now,
25 can we do a broad screen and see what's important, you

1 know, and actually look into exposure?

2 So that's really our preference now. That being
3 said, I am -- you know, maybe something like propanil is
4 so unique, you know, maybe we'd want to just grab
5 propanil. Not now, that's not the priority now clearly.
6 But we might think about doing kind of one pagers, you
7 know, on, okay, here's a chemical. We don't see really a
8 great logical class of interest, but this chemical is
9 still of interest. Maybe we can do an expedited form of
10 the designated document and bring that forward.

11 So it really is resource driven, trying to be
12 efficient, trying to look forward for the Program.

13 PANEL MEMBER BARTELL: Yeah. And I think this is
14 a very challenging exercise, given everything you've
15 pointed out about the rapid changes in uses in all of
16 these pesticides.

17 But I think that's important as you sort of
18 consider where you're prioritizing your immediate efforts
19 for next year, because really you're not just sort of
20 deciding what may go on the list of designated chemicals
21 next, but you're planning ahead for several years of lab
22 activity.

23 And so I would be trying to think of, you know,
24 which of these classes is going to be what I, you know,
25 would like to be measuring five years from now, because

1 that's probably more three- to five-year kind of time
2 scale you're talking about for actually putting in the --
3 you know, developing the lab methods and implementing, you
4 know, some kind of sampling design.

5 And I know that's a -- that's a very challenging
6 kind of activity to try to predict, you know, which of
7 these -- which of these pesticide classes you're going to
8 be most interested in, you know three, five years down the
9 road. But I think that's probably what you want to be
10 trying to think about.

11 And that might argue -- just to be the contrarian
12 here today, that might argue for more like the neonics,
13 because, you know, certainly there's sort of an increasing
14 trend with, I think, a variety of the different neonics in
15 terms of use.

16 DR. BOLSTAD: Hi. I just want to make a couple
17 comments. Heather Bolstad, the Pesticide and
18 Environmental Toxicology Branch of OEHHA.

19 First, I think the relative toxicity is really
20 important. And I've studied extensively imidacloprid as
21 well as methomyl and currently chlorpyrifos. And in terms
22 of relative toxicity, I believe that the
23 organophosphate -- I don't know much about
24 organophosphorus pesticides, but organophosphate
25 pesticides are much more potent than the neonicotinoids.

1 And there are studies of veterinarians that are
2 constantly exposed to pets with imidacloprid on them, and
3 they don't show clinical signs of toxicity, like your
4 farmworker shows when they're exposed to organophosphate
5 pesticides.

6 And then the last thing it sounds like you're not
7 so keen on the third class. And I have something to
8 support, which is propanil, even though it's used in great
9 quantities and was increasing substantially, its only
10 registered use in California, I believe, is cotton.

11 MS. HOOVER: Rice.

12 DR. BOLSTAD: Is it rice? Is it rice?

13 Okay. Sorry.

14 So it's a single commodity, so -- but it does
15 have a common metabolite, you know, with the others. So
16 you'd be looking for DCA. You wouldn't necessarily know
17 it was from propanil or not, but -- so anyway.

18 CHAIRPERSON BRADMAN: Dr. Schwarzman.

19 PANEL MEMBER SCHWARZMAN: I just wanted to say
20 briefly I appreciate your sort of sense of flexibility of
21 would it be interesting to develop a shorter one-page
22 summary investigating, if we were particularly concerned
23 about some compound. But I just wanted to speak sort of
24 from the Panel's side, or my own perspective, in support
25 of the class approach. I think we've seen so many

1 examples of places where there's such fluid shifting from
2 season to season, or year to year, or month to month with
3 what chemicals are used for a variety of applications,
4 that it's just -- the smart way to go is to keep them --
5 keep the focus broad, so that you can pick out what's
6 rising to the top within that broad class. So you already
7 articulated it. I don't need to repeat the why, but I
8 just wanted to sort of speak out in support of that class
9 approach.

10 CHAIRPERSON BRADMAN: I was just going to say, I
11 mean, I think I there's still a lot of us here who are --
12 maybe I'm in the camp with the people at DPR far away that
13 I have a hard time thinking of organophosphorus versus
14 organophosphate. And I feel like glyphosate and the
15 herbicides are kind of in their own -- you know, because
16 their mechanism of toxicity is different. They're in a
17 different class, but I know that that's -- may not be
18 helpful.

19 But, you know, again, I know I'm very interested
20 in the glyphosate and neonicotinoids. I know -- I was
21 also, a few years ago, involved with some priority setting
22 with U.S. EPA. And in that context, the neonicotinoids
23 also came up as something we need, you know, more
24 information on exposure.

25 And you know we saw on the list that these

1 materials are used indoors. And I think there's potential
2 high -- a high potential for exposure, but there's really
3 not much data on either environmental contamination or
4 residential contamination for these or glyphosate, despite
5 the relatively high use outdoors for the glyphosate and
6 then in mixed settings for the neonicotinoids.

7 So I'm -- if I were to prioritize one, you know,
8 part of my -- I think I would prioritize the
9 neonicotinoids, partly because there's relatively little
10 information on them, as we've said, and also -- I mean,
11 and this is kind of another issue if there's another
12 laboratory in California like, you know, Dr. Gerona's lab
13 at UCSF, developing methods for glyphosate, is there any
14 issue where maybe we want to, in terms of the investment
15 there, there would be potential for duplication. And if
16 we want to -- you know, maybe there's other alternatives
17 that would not create burdens on the State lab, and would
18 then leave room for other, you know, biomonitoring
19 activities. I guess that's a question that we haven't
20 really considered.

21 MS. HOOVER: Sara Hoover again.

22 Remember, this is not about which lab methods
23 we're going to develop. So, for example, suppose we
24 wanted to collaborate with Dr. Axel Adams and Dr. Gerona
25 on glyphosate, we need glyphosate to be on our list.

1 So right now, all we're talking about is having a
2 menu of options of things that we can measure. That's it.

3 So, you know, I wouldn't overthink this one.
4 This isn't a vote, you know, at that level. I think that,
5 you know, we've now put this options for the panel slide
6 back up, and I think you could just each go through and
7 say of these three classes, I'd want to see work on this
8 one first, or I'd want to see you continue to screen all
9 three. I'm not interested in -- you know, just each say
10 what your opinion is. That's fine.

11 CHAIRPERSON BRADMAN: I think that's perfect. So
12 why don't we go -- have everyone comment.

13 Should we start on the wings?

14 (Laughter.)

15 PANEL MEMBER QUINTANA: Start on that wing.

16 (Laughter.)

17 CHAIRPERSON BRADMAN: The bookends.

18 So Dr. Luderer.

19 PANEL MEMBER LUDERER: I mean, I think I'm with
20 everybody else that it's difficult for me to decide
21 between the organophosphorus group and the neonicotinoids,
22 but I think I would probably lean towards the
23 organophosphorus.

24 PANEL MEMBER SCHWARZMAN: If I were picking one
25 for designation, just looking at this list of options, I

1 would choose the organophosphorus class for further
2 consideration in 2017. But I like option number 2, which
3 is propose further screening or continued tracking of one
4 or more of these pesticide classes. And I would love to
5 be able to stick neonic -- the neonics into that list.

6 CHAIRPERSON BRADMAN: I think I'll echo Dr.
7 Schwarzman, although I think if I had my druthers, I would
8 say both --

9 (Laughter.)

10 CHAIRPERSON SCHWARZMAN: -- or at least
11 prioritize glyphosate and the neonicotinoids as a class.

12 PANEL MEMBER BARTELL: Yeah, I would agree with
13 Asa. I mean, I think the glyphosate and neonicotinoids
14 class, as a combination, would make a lot of sense. You
15 know, pick the one that really is driving the -- what
16 seems to be driving the use on the OPs. I know it's
17 changing, but -- yeah, that's my two cents.

18 PANEL MEMBER KAVANAUGH-LYNCH: Well, certainly
19 from a breast cancer standpoint, I'm quite interested in
20 the glyphosate and I would like to see us pursue that
21 further. So I'll go with the organophosphorus.

22 PANEL MEMBER FIEHN: Yeah. In terms of the high
23 usage and the toxicity of organophosphorus chemicals, I
24 also think that these would be my priorities. Although, I
25 am interested in neonics, which would be then my second

1 priority.

2 (Laughter.)

3 PANEL MEMBER QUINTANA: I have the same thing to
4 say basically.

5 MS. HOOVER: Thank you very much. This has been
6 really, really helpful, and we're perfectly timed, so move
7 on.

8 CHAIRPERSON BRADMAN: Okay. So, at this point,
9 we have an opportunity for open public comment on any of
10 the topics related to Biomonitoring California. And then
11 after that, we will be -- I'm sorry. Are there two
12 additional?

13 Okay. So just to throw it out there, anyone who
14 wants to make any additional comments, please fill out the
15 form or raise your hand. And if there's anyone on the web
16 who would like to send in some final comments for the open
17 public comment period.

18 So we'll start with Nancy Buermeyer. Thank you.

19 MS. BUERMEYER: Thanks very much. Nancy
20 Buermeyer with the Breast Cancer Fund.

21 I want to thank the Biomonitoring staff for
22 another great Panel discussion and day of panels, and all
23 really interesting information for -- even for us
24 non-scientists. It's really been a really good learning
25 experience.

1 I wanted to just follow up on some of the things
2 my colleague, Dr. Singla, had mentioned around the funding
3 for the environmental justice work. You know, I've been
4 hanging out with you all for a long time and working on
5 funding for this Program for a long time. And this is the
6 first time we were able to get any traction to actually
7 get funding -- additional funding, supplemental,
8 augmentive funding for this Program.

9 And it was something that I worked very closely
10 with Veena and Avi from NRDC on, and we worked really as a
11 team. But as with anything like this, it happens because
12 a lot of folks do a lot of work. And I wanted to just
13 thank, not only the stellar work of the Program, without
14 which we couldn't have made the case to the California
15 legislature and to the Governor's office, I wanted to call
16 out Dr. Kavanaugh-Lynch. The California Breast Cancer
17 Research Program sent a letter extolling the virtues of
18 the program -- it wasn't related to the funding -- for
19 potentially obvious reasons, but just talking about the
20 importance of the Program relative to the CBCRP Program.

21 I know that Panel members have weighed in in the
22 past on the importance of the Program, and asking the
23 California budget committees and Governors to take a
24 little bit of money, and it will go a long way in this
25 program, which has been so effective in getting really

1 much better information about exposure, and the way we've
2 been able to use that information.

3 I will call out particularly the HERMOSA Study
4 was incredibly effective in talking to legislators about
5 the importance of showing what happens when you change
6 people's consumer products, and looking at actual drops in
7 chemical levels. So sort of a long rambling way to say
8 thank you to everybody who pitched in and helped out, not
9 just in the specific efforts around talking to
10 legislators, but in doing the work you do every day,
11 because if we didn't have a product to sell, we wouldn't
12 be very good sales people.

13 So we have an absolute commitment to try to make
14 this more than a one-time event. And so, you know, we
15 look forward to working with the Program to try to get the
16 EJ stuff up and running as quickly as possible, so that
17 when we go back in January and February, we can show the
18 progress, even though we know progress does not move at
19 the rate that politicians would like it to, based on the
20 fact that it's science.

21 But we'll be working closely with you all to try
22 to help get the word out to the EJ community and bring --
23 continue to bring advocates back to the legislature. I
24 did want to make one more note which is that the partner
25 that worked on the ACE -- that is continuing to work on

1 the ACE program, the Asian family services group, actually
2 went with us to a legislative meeting to talk to Phil Ting
3 in San Francisco. And they were very effective,
4 obviously, in talking about the partnership that they have
5 with the Program, and the importance of the study that
6 they were in the midst of.

7 So trying to get more of those community partners
8 who have had actual interface with the Program in to talk
9 to the people who make the decisions about the purse
10 strings is going to be an important ongoing effort. And I
11 just want to, again, thank everybody for their efforts,
12 and we'll be back.

13 So thanks.

14 CHAIRPERSON BRADMAN: And then another request
15 from Veena Singla. Were you going to --

16 DR. SINGLA: No.

17 CHAIRPERSON BRADMAN: You checked open public
18 comment period.

19 DR. SINGLA: No.

20 CHAIRPERSON BRADMAN: Okay.

21 (Laughter.)

22 DR. SINGLA: Emily Marquez, were you going to
23 make an additional comment during the open public comment
24 period?

25 MS. MARQUEZ: I checked it. I already made my

1 comment.

2 CHAIRPERSON BRADMAN: Okay. Are there any other
3 public comments or anything from email?

4 I think, at this point then, we can wrap-up the
5 meeting. A transcript from this meeting will be posted on
6 the Biomonitoring California website when it's available.

7 And also everyone should keep in mind that the
8 next Scientific Guidance Panel meeting will be on November
9 3rd this year also here in Richmond.

10 So I think, at this point, we can adjourn the
11 meeting. So thank you.

12 (Applause.)

13 ACTING DIRECTOR ZEISE: My thanks to the Panel
14 and the Chair for another excellent meeting, and for the
15 staff who prepared so very hard, and for the audience for
16 all the participation. This was just a great meeting.

17 Thank you.

18 (Thereupon the California Environmental
19 Contaminant Biomonitoring Program, Scientific
20 Guidance Panel meeting adjourned at 4:35 p.m.)

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C E R T I F I C A T E O F R E P O R T E R

I, JAMES F. PETERS, a Certified Shorthand Reporter of the State of California, do hereby certify:

That I am a disinterested person herein; that the foregoing California Environmental Contamination Biomonitoring Program Scientific Guidance Panel meeting was reported in shorthand by me, James F. Peters, a Certified Shorthand Reporter of the State of California, and thereafter transcribed under my direction, by computer-assisted transcription.

I further certify that I am not of counsel or attorney for any of the parties to said meeting nor in any way interested in the outcome of said meeting.

IN WITNESS WHEREOF, I have hereunto set my hand this 11th day of August, 2016.



JAMES F. PETERS, CSR
Certified Shorthand Reporter
License No. 10063