

CALIFORNIA ENVIRONMENTAL CONTAMINANT BIOMONITORING PROGRAM

(BIOMONITORING CALIFORNIA)

SCIENTIFIC GUIDANCE PANEL MEETING

CONVENED BY:

OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

STATE OF CALIFORNIA

THE CALIFORNIA ENDOWMENT

LAUREL ROOM

2000 FRANKLIN STREET

OAKLAND, CALIFORNIA

THURSDAY, JULY 25, 2019

10:00 A.M.

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

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

Oliver Fiehn, Ph.D.

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OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT:

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Shoba Iyer, Ph.D., Safer Alternatives Assessment and
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CALIFORNIA DEPARTMENT OF PUBLIC HEALTH:

Kathleen Attfield, Sc.D., Research Scientist, Exposure
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CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

Anne Cooper Doherty, Ph.D., Senior Environmental Scientist

PRESENTERS:

Rebecca Moran, S.M., Staff Research Associate, Department
of Public Health Sciences, University of California, Davis

Gina Solomon, M.D., M.P.H., University of California, San
Francisco

ALSO PRESENT:

Joe Charbonnet, Ph.D., Green Science Policy Institute

Gino Cortopassi, Ph.D., University of California, Davis

Sandipan Datta, Ph.D., University of California, Davis

Michael Lipsett, M.D., Retired, California Department of
Public Health

Joel Tenney, Israel Chemicals

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P R O C E E D I N G S

1
2 PANEL MEMBER BARTELL: Good morning, and welcome.
3 My name is Russ Bartlett. I'm with the Office of
4 Environmental Health Hazard Assessment.

5 Just go through a few logistics before we begin.
6 All the meeting materials were supplied to our SGP Panel
7 members, but there still are meeting materials available
8 on the table outside where you signed in.

9 The restrooms are located to the door just to the
10 left where the Panel members are and immediately to your
11 left. You can also access the restrooms through a door
12 that I'm pointing over there to that side of the room.
13 And if you just go straight and to the left, the rest
14 rooms will be there.

15 Emergency exit, if we do need to do that, you can
16 go through that door, where I just pointed to, immediately
17 turn left and you'll be back on Franklin Street. You can
18 also access that here to the rest room door, turn left,
19 and you'll be at the door to exit on Franklin Street.

20 So for the benefit of those who are joining us by
21 webinar or teleconference, today is very important that
22 speakers, if you're using the microphone, please speak
23 very clearly, and also speak close to the microphone, and
24 even hold the microphone like I am doing right now.

25 This is demonstrating that.

1 (Laughter.)

2 MR. BARTLETT: In addition, webinar and
3 teleconference folks, you'll notice that when you joined
4 the webinar today, you were automatically muted. We ask
5 you to please stay muted for the duration of the meeting
6 today. If you do somehow become unmuted, Biomonitoring
7 California staff will immediately put you back into mute
8 mode.

9 (Laughter.)

10 MR. BARTLETT: If you are muting -- unmuting more
11 than one or twice, we can expel you from the webinar --

12 (Laughter.)

13 MR. BARTLETT: -- but let's not get to that.

14 (Laughter.)

15 MR. BARTLETT: Yes. Thank you.

16 And at this time, I would like to introduce the
17 Director of the Office of Environmental Health Hazard
18 Assessment, Dr. Lauren Zeise.

19 Thank you.

20 DIRECTOR ZEISE: Thank you, Russ. So I'd like to
21 welcome the Panel and the audience to this summer meeting,
22 summer 2019 meeting, of the Scientific Guidance Panel, of
23 the California Environmental Contaminant Biomonitoring
24 Program, also known as Biomonitoring California. Thank
25 you all for participating, and sharing your expertise, and

1 time.

2 So just a quick overview of the spring meeting of
3 the Biomonitoring Program Science Guidance Panel. The
4 primary focus of that meeting was to discuss the Program's
5 priorities, both near term and longer term. So after a
6 Program update, the Panel provided input on projects to
7 include under Biomonitoring California's submission to the
8 Centers for Disease Control and Prevention, the CDC
9 funding opportunity for the State Program.

10 And unfortunately, as many of you have heard,
11 your proposal was not selected for CDC funding. So to let
12 you know we're currently engaged in internal discussions
13 on how to address the budget shortfall, and also how to
14 adjust the Program, so those are ongoing internal
15 discussions.

16 We heard presentations from our three newest
17 Panel Members, Singla -- Veena Singla, Eunha Hoh, and José
18 Suárez. And they discussed research around using
19 measurements in dust to identify chemicals of concern in
20 the indoor environment, applying non-targeted screening
21 analysis to reveal compounds not traditionally
22 biomonitored, and designing intervention studies to
23 evaluate innovative ways for exposure reduction.

24 And the Panel also provided input on chemical
25 groupings for possible future considerations as potential

1 designated chemicals, recommending that OEHHA conduct a
2 preliminary screening of quaternary ammonium compounds, or
3 QACs. And we're going to be hearing a presentation on
4 that screening in the afternoon for those compounds and
5 requesting -- and having the Panel look at recommending --
6 recommendations in that regard and next steps.

7 So a summary of the input from the March of
8 meeting along with a complete transcript is posted on the
9 March SGP meeting page on biomonitoring.ca.gov. And now
10 I'll hand over to our SGP Chair Meg Schwarzman, who will
11 provide more details about today's meeting and begin the
12 formal part of the meeting.

13 PANEL MEMBER SCHWARZMAN: Thank you.

14 Okay. Our adjustment method worked really well
15 here. If you're not speaking right into the mic, I'll
16 just glare at you.

17 (Laughter.)

18 CHAIRPERSON SCHWARZMAN: So if you see me glaring
19 at you, that's my reminder with minimal interruption.

20 We'll try that.

21 (Laughter.)

22 CHAIRPERSON SCHWARZMAN: It worked here anyway.

23 So my job now - thank you, Lauren - is to just do
24 a quick review of the day -- the day's agenda and what our
25 goals are. So as usual, first, we'll receive a Program

1 update this morning. And then the Panel will provide
2 input on the major Program priorities that are going to be
3 included in the upcoming report to the Legislature from
4 the Program.

5 The second part of the morning session, we will
6 focus on biomonitoring results from the Foam Replacement
7 Environmental Exposure Study, FREES. And from the dust
8 and foam sampling that occurred in the larger study that
9 was led by UC Davis.

10 And we'll have time for questions after each
11 talk. Then we'll break for lunch. And after lunch, we'll
12 hear a presentation about applying a class approach for
13 evaluating hazards posed by organohalogen flame retardants
14 based on a report that was sponsored by the Consumer
15 Products Safety Commission and prepared by a Committee of
16 the National Academy of Sciences.

17 The afternoon discussion session with our guest
18 speakers and audience will focus on two things, one is
19 drawing insights from the flame retardant findings that
20 we'll hear about this morning, and looking ahead for the
21 Program in terms of possible future work on flame
22 retardants.

23 Following the afternoon break, we'll hear a
24 presentation on the -- as Lauren just mentioned, on the
25 preliminary screening of quaternary ammonium compounds for

1 possible consideration as a potential designated chemical
2 class. And the Panel will provide input on their highest
3 priority chemical group for preparation as a potential
4 designated chemical document.

5 It could be QACs, based on today's presentation,
6 or we can select from the many differ chemical groups that
7 have been screened by the Program previously. So we'll
8 outline what those possible selections are before the --
9 before the Panel has to provide input.

10 So the last item of the day will be an open
11 public comment period. If you want to provide comments
12 during the meeting, please fill out a comment card
13 available at the table just outside the door or from Russ
14 also --

15 MR. BARTLETT: They're at the table outside the
16 door.

17 CHAIRPERSON SCHWARZMAN: The table outside the
18 door. Okay -- and turn it into Russ Bartlett.

19 Okay. I will call on you on the appropriate
20 moment during the comment periods or in the afternoon
21 discussion section session. And for the benefit of our
22 transcriber, please clearly identify yourself before
23 providing your comment and write your name and affiliation
24 on the card, so that we can make those -- sorry, on the
25 sign-in sheet, so we can make them correspond.

1 If you're joining the meeting via the webcast,
2 you can provide comments via email. And the address is
3 biomonitoring@oehha - O-E-H-H-A - .ca.gov. And we'll read
4 relevant comments allowed, paraphrasing them when
5 necessary. Please keep your comments brief and focused on
6 the items under discussion. And we'll only impose time
7 limits if we need to, based on the rest of the agenda
8 items.

9 So our first item is the Program update
10 presentation of the major priorities, which will be done
11 by Robin Christensen. She is the Chief of the
12 Biomonitoring Investigation and Outreach Unit in the
13 Exposure Assessment Section in the Environmental Health
14 Investigations Branch at CDPH, California Department of
15 Public Health.

16 (Thereupon an overhead presentation was
17 presented as follows.)

18 (Laughter.)

19 CHAIRPERSON SCHWARZMAN: She'll provide an update
20 on current program activities and outline our -- the
21 proposed major priorities that will be included in the
22 upcoming report to the Legislature. And I flagged that
23 because that, if you were listening to our goals for the
24 day, is one of the things that we really want to get clear
25 direction from the Panel. The Program wants clear

1 direction from the Panel about those priorities to be
2 included in the report to the Legislature.

3 So listen carefully.

4 Robin.

5 MS. CHRISTENSEN: Hello. All right.

6 Hi, everybody. I'm Robin Christensen. As you
7 mentioned, I am a Health Program Manager with the
8 California Department of Public Health. I will be giving
9 the Program update today. And before we begin, I wanted
10 to say that due to my oversight, slides 20 and 22 are
11 swapped in your materials. So same materials, just
12 flip-flopped.

13 --o0o--

14 MS. CHRISTENSEN: I wanted to start off today
15 talking about a few updates.

16 So first of you -- first, many of you know that
17 we have had some leadership changes at CDPH. Dr. Karen
18 Smith has recently stepped down and Susan Fanelli is our
19 Acting Director. She's working with Dr. Charity Dean,
20 Assistant Director, and recruitment is currently underway
21 for Dr. Smith's replacement.

22 The Program has also had some recent staff
23 changes as well. Dr. Juan VillaRomero has worked for
24 three years with DTSC on the PFAS analyses. His position
25 was funded through CDC through Sequoia Foundation. He is

1 currently still working with DTSC and he is now a State
2 employee, but he is no longer working with the
3 Biomonitoring California Program.

4 At EHLB, Dr. Ryszard Gajek has retired in June.
5 He was the Supervisor of the Lead and Inorganic Testing
6 Unit since 2012. And he supported both Biomonitoring
7 California and also the Childhood Lead Poisoning
8 Prevention Program. We really want to thank both Juan and
9 Ryszard for their many contributions to the Program.

10 And we also want to welcome Marley Zalay who has
11 joined OEHHA as a Senior Environmental Scientist. Marley
12 has several years experience conducting exposure
13 assessments for occupational and environmental exposures.
14 And she received her M.P.H. from UC Berkeley.

15 And finally, as Lauren mentioned, we were not
16 awarded a third round of CDC cooperative agreement
17 funding. This is disappointing, but the summary statement
18 that we received was actually fairly positive. We scored
19 higher than we did in the two prior rounds of funding.
20 And we have taken the feedback from the objective review
21 panel and we are considering it. And we've asked for more
22 detail from CDC.

23 The competition overall was quite strong. They
24 had 17 competitive applications and Biomonitoring
25 California would like to congratulate Iowa, Michigan,

1 Minnesota, New Hampshire, New Jersey, and New York State
2 for receiving cooperative agreement funding through 2024.

3 --o0o--

4 MS. CHRISTENSEN: So this is a very big loss for
5 our Program, but we did prepare for this possibility. And
6 the CARE Study is currently on track for Region 3. We are
7 looking for ways where we can save money. For example,
8 looking for low-cost temporary office space. We are
9 relying more on in-kind support. And we're trying to
10 figure out how to reduce the time spent in the field,
11 since field work itself can be quite a big cost. The
12 design itself and the timeline are currently looking as
13 though they remain on track.

14 --o0o--

15 MS. CHRISTENSEN: So just a little bit of a
16 reminder of the CARE Study. This is our statewide
17 surveillance study and it is one of the primary mandates
18 of the Program. The purpose is to provide levels on
19 background or baseline levels of chemicals, specifically
20 metals and PFASs across the State. And we do that by
21 recruiting a representative group of Californians across
22 each of the eight regions in the state.

23 We've already been to Los Angeles County and we
24 visited the Inland Valley our second region, and we're
25 looking forward to visiting Region 3, San Diego and

1 Orange.

2 --o0o--

3 MS. CHRISTENSEN: So as I said, CARE L.A. was our
4 first region. We conducted our field work here from
5 February through June 2018. And this was metals and PFASs
6 for everyone, and 1-NP in a subset of 159 individuals.
7 Individual results were returned in January 2019. And for
8 a subset of the population, 60 women, they received
9 additional analyses for environmental phenols. And those
10 results were returned to them in March 2019.

11 Data will be available to the public in
12 September, both on the website and also at a public
13 meeting. We are currently setting up to visit the South
14 Coast Air Quality Management District's 5th Annual
15 Environmental Justice Conference. It's a very good
16 meeting. It is free and open to the public and it's in
17 downtown Los Angeles.

18 --o0o--

19 MS. CHRISTENSEN: So this information here, how
20 representative is CARE L.A. was actually shared at the
21 March SGP. So it's here as a bit of a reminder. We found
22 that CARE L.A. was fairly representative across races,
23 with the exception of Hispanics. Thirty-five percent, or
24 about 150 people, had some or no college. And that's less
25 than half of what you'd expect in the population as a

1 whole. So these were two areas that we identified in CARE
2 L.A. as needing room for improvement in Region 2.

3 Gender, not shown on this slide, was about 61
4 percent female in the population. And the average age of
5 CARE L.A. was about 50 years old.

6 --o0o--

7 MS. CHRISTENSEN: So our staff our currently in
8 the process of doing further data analysis. They're
9 examining distributions by demographics, and making
10 comparisons between our regions, and with NHANES data.
11 They're also looking at sources of exposure from the data
12 collected from our exposure surveys.

13 Some of this information, as I said, will be
14 available to the public in September, and we are all
15 really excited to find out what CARE data can tell us
16 about exposures in L.A. County.

17 --o0o--

18 MS. CHRISTENSEN: So all of this work in CARE
19 L.A. is occurring simultaneously to the labs analyzing
20 CARE 2 samples. CARE 2, which includes Riverside, San
21 Bernardino, Imperial, Mono and Inyo counties started
22 sample collection on February 14th, 2019 and wrapped up on
23 April 30th.

24 This -- as I said, the labs are currently
25 analyzing these samples, but I wanted to give you a little

1 bit of an update on how progress worked in the field.

2 --o0o--

3 MS. CHRISTENSEN: So as you know, CARE has a
4 two-stage recruitment process in order to ensure that our
5 sample reflects the population. The first stage involves
6 completing a pre-screen. And the pre-screen surveys lets
7 us know that people are interested in participating. From
8 the pre-screen pool, we then invite -- select and invite
9 individuals to participate in the study. And this
10 resulted in almost 700 people interested in participating
11 and 555 people who received invitations.

12 Of that group, 436 began enrollment and initiated
13 the process. This means that they completed their
14 informed consent form and completed at least some study
15 steps. 331 people completed all of the study steps, which
16 gives us a completion rate of 60 percent based off of
17 those who were invited.

18 But based off of our experience in CARE L.A. and
19 also based on the response to the pre-screen form, we knew
20 as early as February that we were going to have some
21 trouble achieving goals -- our selection goals for black
22 and Hispanic males in the region. So you can look at this
23 total number and see 331 looks good. It meets our goal of
24 over 300 participants in the region, but it didn't reflect
25 the population the way that we wanted it to.

1 So in CARE L.A. what we had done was we adopted
2 all-in-one model, where we worked closely with community
3 groups to help us recruit from their membership. They
4 brought individuals in and we worked with them all at once
5 in about a 45-minute meeting to collect their samples and
6 all of their survey information.

7 So that worked really well in some respects, but
8 it strayed from our surveillance model quite a bit, and it
9 was more community based. So in CARE 2, we adopted what
10 we call the walk-in model. Where we identified these
11 groups that we were having difficult reaching and we
12 recruited them directly. We said -- we made posters on --
13 and fliers and hung them up in the community. We put
14 postings on craigslist that targeted specifically black
15 and Hispanic males, and we said come on in, but you don't
16 need to complete the survey in advance. We're going to
17 complete everything all at once.

18 It was similar to the walk-in but it had added
19 flexibility for individuals. They were able to come in on
20 their own time. They didn't have to make an appointment
21 on any particular day. They would call the office and
22 then they would drive in. And this actually helped quite
23 a bit to help us meet our goals.

24 --o0o--

25 MS. CHRISTENSEN: All right. So this slide here

1 is different from the prior slide, only that it shows the
2 total number. So after the walk-ins along with the
3 traditional pathway through the pre-screen we ended with
4 359 individuals who completed the study steps.

5 --o0o--

6 MS. CHRISTENSEN: So how did people find out
7 about CARE 2? Well, more than half found us through the
8 postcard, which is double what we found in CARE L.A.

9 --o0o--

10 MS. CHRISTENSEN: So the postcard was very, very
11 useful. And we plan on continuing to use that in the
12 future. Friends, families, local groups, health fairs,
13 meetings, craigslist. This all kind of falls into a
14 looser category of networking. And that also contributed
15 quite a bit, as you can see.

16 --o0o--

17 MS. CHRISTENSEN: In terms of representation in
18 CARE 2, despite the walk-ins, we still came in a bit under
19 on our goal for Hispanics in particular. Overall, we did
20 do a much better job at reflecting the population in
21 Region 2 than in L.A., and we even did a little bit better
22 on education. There's still room for improvement there
23 though.

24 Representation by gender also improved. Region
25 2, 56 percent women, down from 61 percent in CARE L.A.

1 Our average age remained around -- right around 50.

2 --o0o--

3 MS. CHRISTENSEN: So our epidemiologists are
4 analyzing CARE L.A. data. Our labs are analyzing CARE 2
5 samples. And meanwhile, we are also planning for CARE 3
6 field work to begin early next year.

7 Our outreach team has already visited Orange
8 County. And we have two upcoming visits to San Diego
9 County coming up. We are making minor changes to our
10 survey tools and putting forth our IRB amendments. And we
11 are hoping to set up in the field in January 2020 with
12 sample collection beginning in February. This is a really
13 rapid cycle. We're working hard to keep pace with the
14 annual pace of the study.

15 --o0o--

16 MS. CHRISTENSEN: Okay. So I'm going to
17 transition briefly to the East Bay Diesel Exposure
18 Project, or EBDEP. EBDEP recruited 40 families with
19 children living in the Oakland and Richmond area. They
20 collected urine, dust, and air filters at two different
21 time points.

22 Current progress Chris Simpson's lab has already
23 completed analyses of the 1-NP metabolites in the urine
24 samples and 1-NP in both the dust and the air filters.
25 That data is currently under review, and it's being

1 processed. And EBDEP staff are currently working to get
2 ready for results for return to participants in early
3 September.

4 Following the September results return, they'll
5 be holding a series of community meetings in October. And
6 those are tentatively scheduled for West Oakland, East
7 Oakland, and Richmond. The EBDEP participants and other
8 stakeholders will also be invited to our November SGP
9 meeting, where Dr. Asa Bradman will be presenting summary
10 results on the study.

11 --o0o--

12 MS. CHRISTENSEN: For the rest of my time with
13 you today, I will be talking about draft priority language
14 for Biomonitoring California.

15 So as a Program, we meet about annually to
16 discuss strategies and priorities for the Program. And I
17 think Michael DiBartolomeis and Nerissa has presented that
18 information to you before.

19 At the March SGP, we also sought your suggestions
20 for Program priorities. And we've taken your suggestions
21 and we've taken our own and we have come back to you with
22 six draft priority areas to help draft -- help guide our
23 activities over the next few years.

24 We're bringing these priorities to you, so that
25 you can give us any additional input, or edits, or ask any

1 clarifying questions.

2 So Priority 1 is about improving the CARE Study.
3 I've already mentioned a couple of ways where we've tried
4 to improve how we reflect the population. But one of the
5 things that we really want to focus on is improving our
6 study cycle timeline. The 8-year study timeline was
7 already a compromise when the study design was conceived.
8 And the plan was always to scale up the study, if we were
9 ever able to do so.

10 Originally, the Program conceived of the
11 statewide surveillance study as taking somewhere between
12 two to three years and costing somewhere in the
13 neighborhood of \$10 million. That was in 2006. We've
14 never been able to achieve that. And it's not feasible
15 with our current resources. In the absence of CDC
16 funding, we are trying to reevaluate and proceed in a
17 feasible manner and a feasible timeline.

18 So looking forward, we are trying to really
19 consider how we can approach statewide surveillance for
20 the state on our new time frame. Our study cycle is
21 looking a little fuzzy beyond CARE 3. It could become an
22 every other year cycle, for example. We could cluster
23 three or four regions at a time and take a year for a
24 break and make compromises in other areas of the Program.
25 For example, urine-only collection, which would miss out

1 on valuable information on PFASs and on metals in blood.
2 We could move to more of a convenience sample design,
3 which would allow us to accept the first 300 people. It
4 would certainly be easier, faster, and lower cost, but it
5 would never reflect the California population.

6 So although these options are technically
7 feasible, none of them are ideal, and all of them will
8 fall short of the mandate in one way or another. And more
9 importantly, all would probably add less value for
10 stakeholders, researchers, and others.

11 Statewide surveillance is always going to be one
12 of our driving priorities, in part because it provides
13 useful baseline data to inform all of our other work,
14 including --

15 --o0o--

16 MS. CHRISTENSEN: -- conducting biomonitoring
17 studies that seek to better understand and mitigate
18 environmental health inequities. EBDEP is a great example
19 of this, and there's room for more exploration of some of
20 the social determinants that play into our environment.
21 We know that there is historical discrimination that has
22 been institutionalized into our zoning, our housing, our
23 industries, occupations and traffic patterns.

24 SGP has frequently mentioned pesticides in
25 farming communities, immigrant groups, and occupational

1 groups. And that falls under this priority as well.

2 Where CARE surveillance data can provide the
3 baseline, targeted biomonitoring studies can identify the
4 communities that are most at risk of disproportionate
5 exposures and harm from these chemicals.

6 --o0o--

7 MS. CHRISTENSEN: Priority 3, this is the one out
8 of order. Priority 3, we would like to work with
9 stakeholders to assist local environmental and public
10 health responses. We currently already do this to some
11 extent. And as a Program, we can expand our approach and
12 be better prepared for future requests.

13 We know, for example, that counties frequently
14 contact CDPH to request assistance on -- or guidance on
15 local mercury or arsenic cases. And we have also begun to
16 receive inquiries about exposures during wildfires.

17 There's still a lot that's unknown about
18 exposures to dust and water after the fire. And that is
19 something that we have also talked about within this
20 group. So this priority is one way that our Program can
21 add value to environmental and public health work that's
22 already being carried out at the local level.

23 --o0o--

24 MS. CHRISTENSEN: Priority 4, maintaining our
25 laboratories. And I want to say at this point, these are

1 not ranked in any order, because if they were, the
2 Priority 4 should be Priority number 1.

3 Without maintaining our core laboratory
4 capabilities and upgrading our capacity, we're going to be
5 unable to address any of the other work, any of the other
6 priorities on this list.

7 The SGP often recommends biomonitoring new
8 classes of chemicals. And in order to do this, we really
9 need to prioritize our laboratories and make sure that
10 they are sustainable for the future.

11 --o0o--

12 MS. CHRISTENSEN: Priority 5 is about increasing
13 public access to our data and to our findings.
14 Biomonitoring California is a data-generating machine, but
15 we are not yet a data-releasing machine. So as a program,
16 we would like to prioritize releasing data to the public
17 to help support evidence-based decision making. For
18 example, our statewide PFAS data from CARE could go a long
19 way to help inform the State's drinking water standards.
20 And EBDEP could do the same with certain diesel -- certain
21 policies on diesel.

22 --o0o--

23 MS. CHRISTENSEN: Scientific data itself is
24 important, but it is also important for us to be expanding
25 and translating these findings into meaningful guidance

1 significant support and flexibility to our laboratories.

2 Certain technical supplies may be more difficult
3 to acquire. It may take longer to acquire supplies and
4 maintenance of instruments may become a challenge.

5 We may find that we need to scale back what we
6 are able to take on. But CDC cooperative agreement
7 funding by its nature was never meant to be a long-term,
8 stable source of funding for the Program.

9 As Lauren mentioned, we are working internally to
10 find solutions. But in the meantime, in the absence of
11 CDC funding, our activities will remain pragmatic, while
12 our priorities are going to be hopeful.

13 --o0o--

14 MS. CHRISTENSEN: So I'd like to thank everybody
15 in the room today, and especially our Biomonitoring
16 California staff who work very hard to accomplish this
17 terrific Program.

18 Thank you.

19 CHAIRPERSON SCHWARZMAN: Thanks so much, Robin.
20 I want to open it up to clarifying questions first and
21 then we'll start a discussion. So clarifying questions
22 from the Panel specifically?

23 Yes. Jenny.

24 PANEL MEMBER QUINTANA: Hi. Thank you for that.
25 I just had a clarifying question about the CARE studies.

1 You didn't comment on the geographical representation.

2 And I was wondering about that, because we have community
3 meetings. They tend to be very geographically clustered.
4 And so is that something you're going to look at in the
5 future how geographically representative your sample was
6 in L.A., for example, or is that something that you
7 already know?

8 MS. CHRISTENSEN: You know, that's not something
9 that I have offhand when I said that I'm excited to see
10 what the CARE L.A. findings look like. I meant that truly
11 from myself as well. I've been told that I will receive
12 some of that information next week. But maybe somebody in
13 this room would like to comment?

14 DR. WU: Hi. This Is Nerissa Wu, Biomonitoring
15 California. When we set up our goals for sampling, we do
16 create zones within the region, so that we are trying to
17 represent across different geographic neighborhoods.

18 For example, L.A. County is broken down by the
19 Service Provider Areas. And so we did have specific goals
20 for each one of those SPAs in L.A. And within Region 2,
21 which is geographically very wide spread, we had zones
22 that represented the urban core, and then the more
23 suburban ring, and then up into Inyo and Mono to make sure
24 that we are getting geographic spread across each region.

25 We are concerned -- you alluded to -- sorry to

1 interrupt you. We are concerned with clustering. When we
2 look at community groups and recruitment through, for
3 example, the all-in-ones that Robin mentioned, where you
4 might have people who have a -- who are already associated
5 in some way and might have similar exposure patterns, and
6 how that clustering might impact our data. So we are wary
7 of that when we create our recruitment protocols.

8 PANEL MEMBER QUINTANA: So with the zones, do you
9 know if you met those zone goals or not?

10 MS. CHRISTENSEN: Just very roughly, yes, that
11 was one of the easiest ways to meet the goal. We did
12 struggle a bit in Mono and Inyo counties. The population
13 is very small. And so for our goals in those areas, we
14 actually were trying to oversample, so that we could say
15 something, because if it was in direct proportion to what
16 was in the population, we'd end up with like one person
17 from either county. So we came in under where we wanted
18 to be, but we definitely over-shot the one person per
19 county, yeah.

20 (Laughter.)

21 CHAIRPERSON SCHWARZMAN: Yeah, Carl.

22 PANEL MEMBER CRANOR: Carl Cranor. I want to
23 look at your draft priorities here for second. Taking the
24 biomonitoring information and moving forward -- sorry. Is
25 the -- do you have good relationships with people that can

1 affect some of these priorities?

2 For example, I mean, sometimes it may be matter
3 of what people eat that cause problems. But I'm wondering
4 if you have a sense from your studies, to what extent can
5 individuals control what happens to them, as opposed to
6 our State and maybe private institutions that may call for
7 changes in their behavior? Those are rather different
8 things. I sometimes worry that there's too much emphasis
9 on personal choices and not enough emphasis on
10 institutional choices.

11 Thank you.

12 MS. CHRISTENSEN: Well, I am really sympathetic
13 to that concern. I share that concern. We -- both are
14 important. The individual has a lot -- has control over
15 many things in their lives, but they do not have control
16 over everything. We find like that in some situations
17 regulation, policy change, may go further to removing
18 chemicals from our lives.

19 That said, it's not in our -- we are not here to
20 advocate for policy change or any regulations. We are
21 providing individuals with helpful guidance, that -- so
22 that they can make changes in their lives. And that is
23 something that we can do, and it's also -- it's also
24 something that people want. They -- after a person
25 participates in a biomonitoring study, they are often

1 looking to what they can do first and foremost.

2 The bigger changes that you discuss, they take
3 time, they take effort, and for the average participant,
4 they want to know what changes they can make in the short
5 term.

6 PANEL MEMBER CRANOR: Sure.

7 DIRECTOR ZEISE: I just wanted to add something.
8 One of the -- in addition to your remarks. One of the
9 major things as part of the Biomonitoring Program in
10 establishing legislation was the issue of regulatory
11 effectiveness. And I think information coming from the
12 Program has been very useful in us understanding how
13 different actions by the State, by the Legislature, by the
14 agencies have affected exposures. So there is that as
15 well.

16 MS. CHRISTENSEN: Thank you.

17 CHAIRPERSON SCHWARZMAN: Ulrike.

18 PANEL MEMBER LUDERER: Can you hear me?

19 Okay. Thank you very much for that presentation.
20 I have a question about the draft priority maintaining
21 core laboratory capabilities, which I agree is fundamental
22 to all the other priorities. And I was wondering if you,
23 or maybe the laboratory managers, I mean, can say
24 something about how -- how that is going and how the --
25 you know, the baseline funding, once you factor in

1 maintaining the core laboratory capabilities, you know,
2 what -- how much room is there for -- how much is left
3 over essentially?

4 CHAIRPERSON SCHWARZMAN: Can I expand on that
5 question for just a sec to add a piece, because I was
6 wondering a similar thing is I know the laboratories don't
7 only exist for the purpose of Biomonitoring California.
8 So how much is the Biomonitoring California responsible
9 for maintaining those core functions? And, you know, the
10 DTSC lab does lots of other work also and maintains some
11 panels, and core functions. So if we could understand a
12 little bit about that balance, that might be helpful.

13 MS. CHRISTENSEN: I am not the right person to
14 answer that question at all, but I can say that I've heard
15 from both the Jed and June-Soo and Sabrina that the
16 existing Biomonitoring California budget that goes to the
17 laboratories is probably already maxed out in terms of
18 what they are able to do.

19 I have heard that they're -- it is often
20 supplemented by other sources of funding when that's
21 possible. Jed, do you want to weigh in any further?

22 DR. WU: This is Nerissa again. And I am also
23 not a laboratorian, so maybe Jed will come up here
24 afterwards, but it's not only in the total volume of
25 money, it's also in the flexibility of what State funding

1 can do. So things like being able to support our
2 instrumentation with preventive maintenance. We have
3 instruments breaking down all the time and State funding
4 is just not flexible enough to be able to, you know,
5 support them over the long term to say, well, it makes
6 sense for us to have a contract to have somebody come and
7 support these machines.

8 We can't quickly get supplies. We can't quickly
9 change direction. I mean, there's so many things we're
10 interested in looking at, but we can't change staff
11 quickly. We can't change equipment -- we can't go out and
12 procure equipment quickly. There's things like --
13 actually, Jed is up here now, so he'll be able to give you
14 more detail.

15 Let me turn --

16 DR. WALDMAN: This is Jed Waldman for the
17 Environmental Health Lab. I think Nerissa hit it pretty
18 much on the head. We are always squeezed, you know,
19 budget-wise. That's just part -- a fact of life for any
20 State program. When we have the funding, we were
21 squeezed. Without the funding, we'll be squeezed.

22 But the loss of flexibility to support the kind
23 of project that we're describing here of CARE being in the
24 field, trying to turn around samples quickly is -- that is
25 probably the most devastating loss for us, because as some

1 of you who have collaborated with us there's a strict
2 timeline.

3 Working with State funds can mean a long delay in
4 instrument repair, unlike when we can use -- when we've
5 been able to use CDC funds to turn that around much more
6 quickly. An instrument breaks down between June and
7 August, we're -- we don't even have access to State funds
8 while the budget is changing. So I would say that's
9 probably the biggest problem.

10 CHAIRPERSON SCHWARZMAN: Oh, great. One more.

11 DR. SHE: I think that at this moment the
12 leverage between -- oh, Jianwen She, Biomonitoring
13 Laboratory leader for CDPH.

14 So at this challenging times, I think we need to
15 be able to think about the collaborations. And, for
16 example, the leverage between the different programs, how
17 we can benefit. Because the laboratory instrument not
18 used for Biomonitoring Program alone. Some machine used
19 by the lab to support other activities. So the leverage
20 between the Program needs to be strengthened.

21 Second part regarding staffing, we always
22 experience staffing come here, get trained, then move out,
23 because we do not have the uphand movement for the staff,
24 the opportunities. So I think that we still need to
25 publish more scientifically. We are a world class

1 laboratory, attract young people, post docs, and fellows,
2 which we did in the past, and to support the method
3 development.

4 So that's -- there are other bureaucratic -- data
5 purchase system. I think Jed already touched. We need to
6 look for the way to compensate that flexibility with some
7 more fund. So try to maintain majority of our laboratory
8 capacity we already developed.

9 But regarding the new method, we may be need to
10 slow down a little bit and think of what's our real focus.

11 CHAIRPERSON SCHWARZMAN: Can I ask one other
12 related lab question, which is certain studies rely on
13 collaborating labs, like current ones involve UC Davis
14 that we'll hear about, and UW, you were just talking
15 about, University of Washington.

16 MR. CHRISTENSEN: Um-hmm.

17 CHAIRPERSON SCHWARZMAN: Can you say anything
18 more general about that, or anyone from the lab or the
19 Program, who can reflect on the -- what those
20 collaborating labs give the Program and what they don't
21 give the Program? You know, like, what can be -- I
22 realize you have to pay for the lab collaboration. It's
23 not free. But in terms of this maintaining basic
24 instrumentation and capacity, to what extent can those
25 collaborations help with that versus there's no substitute

1 for, you know, our own lab?

2 MS. CHRISTENSEN: I will be happy to share my
3 opinion, which is not necessarily the same as the opinion
4 of others in the group. I think that the collaborations
5 are particularly useful for the panels for which we don't
6 have a method. It helps us to bring in things that are
7 more on the boundary of research, or new or exciting
8 things.

9 The burden of creating a new method is huge. It
10 takes quite a bit of time. It's one analyst working like
11 close to full time for at least a year. And that's not
12 necessarily something that we want to prioritize our
13 Program focusing its limited resources on.

14 But as others develop the new methods and we are
15 able to make use of them, and then they become more
16 commonplace, it is easier to transfer and learn from
17 others. So that is one role that they can play.

18 It also can help us out in areas where we might
19 not have a large volume or a continuous stream. Both the
20 PFAS and the metals are two great examples of methods that
21 we are always going to have within the Program, because
22 there is a constant demand for it. So it would not make
23 sense to shop those out.

24 You want to weigh in?

25 DR. WU: Sure. I mean, I think there's always

1 this tradeoff between building a Program that can do --
2 that can be broad and one that can be deep. And we've
3 wrestled with that here with our prioritization. Do we
4 want to really focus and maintain our instruments,
5 maintain our staff and have very few methods that are very
6 reliable or do we want to be exploring all these?

7 And there are so many chemicals and new panels
8 that we want to be exploring, but that does require method
9 development, new staff, new equipment. So as Robin
10 alluded to, sometimes it is great to be able to shop it
11 out to, for example, University of Washington. There
12 are -- there are tradeoffs with that as well though. I
13 mean, for one thing the funding -- the flexibility of
14 funding to contract with outside labs can be very
15 difficult and it varies from year to year.

16 So if we're trying to do surveillance and collect
17 data year to year, we don't -- it's not a reliable method.
18 We don't know that we'll be able to contract out
19 year-to-year to the same lab. And that comparability of
20 data is another way that I worry about going to contract
21 labs. When we have our staff, we have regular PT, we have
22 very rigorous standards, and we can compare the data year
23 to year. That's a very valuable part of surveillance.

24 If we're going between different labs and perhaps
25 changing from one panel to another, we lose some of the

1 cohesion of surveillance. That's really important to us.

2 CHAIRPERSON SCHWARZMAN: Jenny.

3 PANEL MEMBER QUINTANA: Hi. This is a kind of a
4 narrow clarifying question. But I thought I heard you say
5 that the State funding, either it was difficult or
6 impossible to get service contracts for the instruments.
7 And when you're talking about turning samples around
8 quickly, you know, it's a horrifying thought not to have a
9 service contract for instruments. And I don't know anyone
10 in a lab that's happy operating without a service
11 contract. They're getting so complicated these
12 instruments.

13 And so I just want to clarify that I heard that
14 correctly and I want to also state I think it's very
15 important that that funding be there for service
16 contracts.

17 MS. CHRISTENSEN: This may vary between our lab
18 at DTSC and the lab at CDPH, but Sabrina will weigh in.

19 DR. CRISPO SMITH: Hi. Sabrina Smith from DTSC.
20 Can you hear me?

21 Is that good?

22 Sabrina Smith from DTSC.

23 I want to first speak a little bit to the
24 original question, which is why I stood up, was DTSC
25 funding. We have biomonitoring funding. We have other

1 funding. We share that other funding with the rest of the
2 lab. And actually, particular biomonitoring studies need
3 to be funded through specific funding. We can't grab
4 funding from other sections to use for our purposes. We
5 do sometimes work on similar instruments, so things like
6 service contracts can be split.

7 But, yeah, there's not a way -- we do some
8 in-kind work. A couple of the people listed up there are
9 actually not under the Biomonitoring California staff, but
10 we do in-kind work for -- with them

11 The second about service contracts. I don't
12 know -- I can't speak to California Department of Public
13 Health, but I do know that a large portion of my budget
14 every year goes to service contracts through the State
15 funding. And the reason for that, as you said, we do not
16 want to be waiting weeks for our instruments to be fixed.
17 But service contracts are expensive, and so that does take
18 away from supply money.

19 And the CDC funding was something where we were
20 like, oh, we always have this additional funding. If they
21 come with an additional project for us to do, we can
22 quickly bump up our supplies. But we do take into account
23 service contracts, at least at DTSC.

24 CHAIRPERSON SCHWARZMAN: Yeah. Oliver.

25 PANEL MEMBER FIEHN: Woops.

1 My name is Oliver Fiehn. I am directing a
2 laboratory with 17 mass spectrometers. We have two
3 service contracts. And that means for 15 mass
4 spectrometers, we do not use service contracts, because
5 they don't break down very often. We have a history that
6 we know for roughly how many machines will break down per
7 year, and so we will call in engineers when we need them.

8 That is saving a lot of money. I would not be
9 able to fund service contracts for 17 mass spectrometers.
10 This is not a sustainable business model. Unless you have
11 a machine that you know is so, how can I say, often
12 breaking down, then you need obviously a service contract.
13 But when you have enough machines and you have a budget
14 that, you know, where you can pay an engineer to come when
15 you need it, that engineer may be \$5,000, may be plus
16 repair parts. It will be usually \$8,000 at the end. But
17 it's much less than a service contract that easily comes
18 for \$30,000 a piece, per year. So I am just saying that,
19 you know, there might be savings possible.

20 DR. WALDMAN: Jed Waldman, Environmental Health
21 Lab again.

22 I agree with you totally, we have more than a
23 dozen mass spec instruments, and we don't have service --
24 preventative maintenance on all of them. It would be
25 prohibited. We have mostly staff who are Ph.D.s. And we

1 believe that most, especially in the ICP mass spec lab
2 very good at maintaining themselves.

3 With a high resolution instrument, that's one
4 that is relied on, we do spend the money and it's quite
5 expensive. As you say, 30 to 50 thousand dollars per
6 year. It gives us better service and it keeps the
7 instruments that have a turnaround time issue.

8 However, the State makes those service contracts
9 very challenging in the -- but without them, the
10 arrangement when we have a breakdown can take weeks to
11 months. And so it's a tradeoff in terms of timing versus
12 money. I can have a doctorate -- doctoral level person
13 spending a week going through the paperwork, and that's
14 not a good use of their time.

15 So back to the CDC funds. And I think the
16 question of some of our partners are also extramural
17 funded collaborations and we can use those resources as
18 well. Doing this sort of work within the State
19 bureaucracy is a set of challenges and this hybrid program
20 has really helped us to date.

21 CHAIRPERSON SCHWARZMAN: I think this is a useful
22 conversation, but I want to make sure we get onto the
23 discussion.

24 Tom, did you have a question or a discussion?

25 PANEL MEMBER McKONE: I was going to ask a

1 question. Are we moving now to discussion?

2 CHAIRPERSON SCHWARZMAN: Yes. Let's move --

3 Okay. Great. Our job till about 11:15 is to
4 have a conversation about these priorities that the
5 Program is proposing putting into the report today
6 legislature, and see if there are any sort of edits or
7 adjustments that we would suggest or other ideas. And
8 before we wrap-up the conversation, we'll try to put a
9 fine point on it. We don't -- we're not going to take a
10 vote, but -- so that we get a concise set of
11 recommendations back to the Program. So we can open it up
12 to more discussion about these priorities going beyond the
13 lab discussion.

14 Tom.

15 PANEL MEMBER MCKONE: Okay. Right up to it.

16 So I would suggest, in looking at this, that
17 there's two -- and I think the discussions we had
18 afterwards led to this point, that there are two kind of
19 overarching priorities. And then the other ones kind of
20 fold under these or within them. And so the overarching
21 to me I think are, A, which we talked, to keep the
22 equipment running, to keep the capacity there. Because
23 without that, you can't do much else.

24 But the other one is to keep the samples moving.
25 And this is where I think in thinking about the priorities

1 is kind of this -- and I think this is a good point for
2 discussion, do we try and follow the CARE plan or do we
3 also try and set it up, given the funding constraints is
4 finding opportunities to keep the samples flowing. And I
5 think that was in the priorities. There were a number of
6 cases where you talk about opportunities to collaborate
7 with others.

8 And so I think the real tricky priority to keep
9 the samples coming in is to spend time identifying
10 partners, who -- maybe not funding partners, but partners
11 who need the capacity to do biomonitoring or are very
12 interested in it, and then figure out how to use that to
13 meet the other priorities of the Program.

14 So a little bit different way, but I just think
15 this -- the need to keep -- you know, you -- with the
16 funding problems, you may not get the samples you
17 necessarily want all the time, but it's worth it to go out
18 and search for opportunities to keep samples moving,
19 because I think the more information you get, the more it
20 helps the Program, and also having a good partner. I
21 mean, who knows, you may discover somebody, you know, an
22 agency or a community, or something that really gets so
23 invested in this that they have some political clout to
24 get some more funding for it.

25 CHAIRPERSON SCHWARZMAN: Can I just tag onto

1 that, Tom, to say would you agree that part of keeping the
2 samples moving is it's not just sample collection, right,
3 it's analysis? So you're not just saying bring a bunch of
4 data in?

5 PANEL MEMBER MCKONE: No. Yeah, that's what I'm
6 saying, you know, you want to have things coming -- I
7 mean, like I'm thinking of the example of wildfires. I
8 mean, it created a -- I mean, there are a lot of people
9 really worried about what are the impacts. But there's a
10 very important opportunity, and it may not fit necessarily
11 with the plan that's there, parts of it. But seeing these
12 opportunities and seeing a community who has a concern and
13 maybe can leverage some funding, and say, look, we have a
14 lot of samples, if you can analyze them, or we could pay
15 for some of it.

16 And again, I don't know how that works. But in
17 someways having the equipment there and also keeping the
18 equipment busy are kind of two priorities to --

19 CHAIRPERSON SCHWARZMAN: I guess, what I was
20 meaning to flag was not just the lab analysis, but the --
21 do the epidemiology on it, because I think -- I just
22 wanted to acknowledge that, because it's two distinct
23 efforts within the Program. It requires different
24 expertise and both requires funding, and you don't get
25 output from the Program without both, right?

1 And it's one of the things that I think we've
2 talked about on the Panel is kind of creative ways to say
3 recruit more doctoral student labor, essentially. You
4 know, doctoral students who need data sets to do their
5 dissertations. And can -- is that a place that we can
6 expand biomonitoring capacity without any more money to
7 accomplish one of those two pieces. One is obtaining the
8 samples and analyzing them in the lab and then the other
9 is working with the data.

10 DR. WU: Can I ask a clarifying question?

11 Are you suggesting that we move away from
12 surveillance? Because it sounds to -- we can keep samples
13 moving by working with collaborators. And certainly,
14 there is valuable biomonitoring information to be gained
15 from the targeted studies that are done around the state
16 by other entities.

17 But that does move us away from the CARE Study.
18 And one of the values of it is its consistency and its --
19 the time trend over -- you know, the swath of time over
20 which we're collecting samples year after year to make
21 this comparison. So we could move away from it and come
22 back to it at some point. But it -- but then it sort of
23 isolates our two first regions. And then when we come
24 back, it's hard to know what that comparison means. Do we
25 compare the same regions over time? Do we continue to

1 look around the state?

2 I mean, I guess I'm looking for clarification on
3 whether you feel that surveillance should not be one of
4 our priorities, because I'm not sure how to do -- how to
5 fit what you're saying into the model we have right now,
6 which I'm not saying is wrong, but --

7 PANEL MEMBER MCKONE: Well, I would say
8 surveillance is really -- that was why the Program was
9 established. I guess what I'm just asking in tight
10 budgets is -- and I don't have the answer. I'm just --
11 this is a discussion point. Is CARE the priority or is it
12 CARE and other opportunities for surveillance,
13 particularly those that would be complementary to CARE and
14 maybe even fold into it.

15 And I say that because you were talking at one
16 point about you may delay CARE for a year. And I would
17 say, if that happens and you found another surveillance
18 opportunity, you know, do you spend that year like pushing
19 everything back or taking other surveillance
20 opportunities, you know -- you know, where community
21 has -- comes and says we need something or has a question?

22 And again, this is a bit hypothetical, but I
23 thought -- you know, I guess the priority question is do
24 you keep the Program as it's envisioned now with CARE --
25 with -- well, I would say with surveillance, because we've

1 done a lot of very -- we've done a lot of very useful
2 surveillance exercises in the past, which were the
3 foundation for designing and building CARE.

4 So I guess that's the discussion point is how do
5 we look for surveillance opportunities that may not be
6 exactly what you want, but could keep the -- kind of the
7 machinery of the Program going or stick with what you want
8 and try and -- I mean, the other thing to do is look
9 for -- you know, look for additional endowment funding or
10 things like that.

11 CHAIRPERSON SCHWARZMAN: Veena.

12 PANEL MEMBER SINGLA: Hi. Good morning. This is
13 Veena Singla. Thank you so much for that very informative
14 presentation.

15 I had kind of an overarching comment and question
16 just in thinking about the priorities and what's more
17 important. You know, it's certainly sort of an
18 intersection or cross-walk between a number of different
19 factors: of course, the mandate of the Program and what's
20 the most important for public health and those priorities,
21 and then thinking about scientifically what are some of
22 the priorities and advancing the science.

23 But I think also trying to understand a little
24 bit better in terms of funding, thinking about priorities.
25 So, you know, Robin, you mentioned that the CDC

1 cooperative funding was never seen as -- you know, meant
2 to be or seen as long-term funding for the Program and
3 that was understood.

4 So I'd like to understand better what is the
5 vision for long-term funding for the Program? Is more
6 State funding envisioned to play a role there? And I
7 think that will help us think about how the long-term
8 priorities for funding could intersect with the priorities
9 for the Program, if that -- does that makes sense?

10 MS. CHRISTENSEN: Yes. And that's hard to
11 answer. I can envision a lot of things for the Program.
12 And it would -- I could envision a future where we have
13 unlimited State funding that met our original goal, but we
14 can't make that happen. And there are a number of other
15 programs that are also in a similar boat.

16 So the people who are prioritizing these things
17 will be weighing our needs against those of others and
18 making decisions based on that.

19 CHAIRPERSON SCHWARZMAN: Carl.

20 I'm going to go right down the line, like this.

21 DR. LIPSETT: Actually, Meg, could I

22 CHAIRPERSON SCHWARZMAN: Oh, sorry, yes.

23 DR. LIPSETT: I know this is out of order here,
24 but I think I can respond to -- oh, yes, I will.

25 I'm Michael Lipsett. I was involved with this

1 Program from the very beginning. And I think I can
2 provide a little bit of clarity with respect to what the
3 notions of long term and shorter term funding. So the
4 legislation for this Program came into effect just before
5 the recession of 2007/'08/'09. The Program would actually
6 have been axed. It was initially under general funding.
7 But for the intervention of some very dedicated people in
8 the legislature, it shifted much of it to State funding as
9 well.

10 We wrote the first grant to the CDC in, I think,
11 about a year and a half after the Program started. And it
12 was intended to provide, you know, the -- at least an
13 interim type of support until this -- until the economy
14 recovered. And the concept the thought at that time was
15 that once the economy recovered, that the State would be
16 funding the Program at a better level.

17 The Program really would not exist without the
18 CDC funding. It was -- it really was an enormous help in
19 getting everything established. And it was great that it
20 continued for 10 years. But at this point, I think
21 despite the sort of guarded optimism within the State
22 staff here, this is really a catastrophe for the Program.
23 And I think that -- I would like to suggest for the
24 Panel's consideration that you might -- I know you're not
25 political, but you might want to just weigh in as a Panel

1 and send some sort of letter to the Governor, or the heads
2 of the different departments about the importance of the
3 Program, and that there be strong consideration given to
4 providing additional State funding for this Program.

5 CHAIRPERSON SCHWARZMAN: So I just want to
6 encourage everybody to be quite concise in their comments.
7 We only have until 11:15.

8 DR. LIPSETT: Sorry, Meg.

9 CHAIRPERSON SCHWARZMAN: No. Thank you for that.
10 Thank you for that. It wasn't targeted at you, Michael.

11 (Laughter.)

12 CHAIRPERSON SCHWARZMAN: Because we need to
13 wrap-up this conversation, but I want to make sure that
14 all these ideas get together before we have to kind of
15 make a formal recommen -- not formal, make a
16 recommendation.

17 PANEL MEMBER LUDERER: Okay. I'll try to be very
18 concise. So I just kind of wanted to continue on with
19 this idea of the surveillance versus, you know, targeted
20 studies and collaborations. And I really think that they
21 are both important and they can really kind of synergize
22 one another. And, you know, I think one of the things
23 that we heard this morning already was about the
24 usefulness of neighborhood groups in assisting with the
25 recruitment for the different -- the different pieces of

1 CARE that are ongoing or have already happened.

2 And what -- and over time as you go back to some
3 of these communities, you know, those relationships I
4 think really have the potential to grow and for targeted
5 studies to evolve out of those relationships. So I, you
6 know, want to encourage maintaining those kinds of
7 relationships over time.

8 CHAIRPERSON SCHWARZMAN: Jenny.

9 PANEL MEMBER QUINTANA: Hi. Two very concise
10 comments. The first concise one was none of the
11 priorities seem to include what Lauren Zeise brought up,
12 which was the regulatory effectiveness of policies. And I
13 would say that should be an explicit and separate
14 priority, and that would really bring in, for example, the
15 Diesel -- like East Bay Diesel Exposure Project and
16 looking at reductions due to clean diesel. So that's one
17 comment.

18 And then the other comment is, just to be blunt,
19 I felt like the surveillance, the CARE studies were
20 starting out very underfunded. They weren't a complete
21 and perfect snapshot of the communities. And in so much
22 as surveillance is not a perfect snapshot, they are less
23 useful for surveillance purposes.

24 You know, if they're not a completely random
25 population-based sample, and we see from the education

1 variable at least, they do not seem to reflect perfectly
2 the communities, even though heroic efforts were made.
3 But these things take a huge amount of funding and time --
4 staff time, and calling people, and calling, you know, all
5 these different stakeholders. It just takes a huge amount
6 of time to do it.

7 And I just feel like I think that you should
8 think about suspending that part personally, until there's
9 actually funding to do it, because you can't do
10 everything. You're stretched so thin. And I think the
11 laboratory is a core piece. And I do think that there are
12 projects going on that you can accomplish some of the same
13 goals by getting samples to analyze. And I just think
14 it's -- you can't do everything with less funding
15 basically. And it's -- and this is -- I just want to add
16 that you've done heroic and wonderful things, so not a
17 criticism at all, but just the reality.

18 CHAIRPERSON SCHWARZMAN: Let's have a comment
19 from Carl and then we need to call public comment and then
20 we'll take the next step here.

21 PANEL MEMBER CRANOR: I'll try to be quick.

22 Budget. What's the sense. You may not want to
23 talk about this, but the diagnosis. The Program was born
24 in a recession and we're -- California in particular and
25 California revenues are soaring, and the question is who

1 is or is not assisting the Biomonitoring Program? What
2 barriers does one run into? I understand you may not want
3 to talk about this, but it does seem to me we should -- we
4 should be and are in a better State fiscal position, in
5 terms of California GDP. We're the, what, 6th largest
6 country in the world, or something like that, and the
7 budget is a problem.

8 CHAIRPERSON SCHWARZMAN: I just want to check at
9 this point for public comment, whether we have any cards
10 or any comments online?

11 MR. BARTLETT: Thank you, Meg. And also, I just
12 want to remind folks on the webinar that if you want to
13 submit a question or comment, please do so by emailing at
14 biomonitoring@oehha.ca.gov. The chat features are not
15 operating on the webinar today.

16 Thank you.

17 CHAIRPERSON SCHWARZMAN: So, Russ, does that mean
18 we have no public comment at this point?

19 MR. BARTLETT: So that's right. At this time, we
20 have no online, we have no emails, for comments.

21 Thank you.

22 CHAIRPERSON SCHWARZMAN: Okay. Anyone in the
23 audience who would like to make a comment with regard to
24 this conversation?

25 Okay. There's one. Gina.

1 DR. SOLOMON: Just a quick question. This is
2 Gina Solomon. Public Health Institute and UCSF. Just a
3 quick question. I was trying to get a handle with the
4 CARE study as to how much of the cost is actually getting
5 teams into the field? Because if so, just looking at CARE
6 4, just wondering if there would be any advantage to
7 skipping ahead to the Bay Area and addressing the travel
8 costs in that year while trying to get funding for the
9 future?

10 (Laughter.)

11 MS. CHRISTENSEN: Oh, gosh. Well, yes, we did
12 consider that. We did consider that. But the fact is for
13 CARE 3, we have sufficient funding. We are looking to
14 scale down. So I can give you numbers from CARE 2 and
15 CARE L.A. But we are hoping to make sure that our model
16 becomes a bit more economical.

17 I would say that field work probably costs on the
18 level of about \$200,000, give or take. And that has to
19 do -- it's about two months of time. It supports
20 temporary staff, temporary skilled staff, all of the
21 supplies, the locations that we need to book, and all of
22 the costs associated with the participant incentives.

23 Moving to the Bay Area, I'm not actually sure
24 that it would save much money, but it is something that
25 would make it certainly easier for our staff to take on.

1 We would need less temporary staff for example, and we'd
2 take on more in-kind work.

3 MS. HOOVER: Meg, can I just make a quick
4 suggestion. We have about seven minutes left and we've
5 heard some really good feedback. But could we just run
6 through -- maybe you could click through the priorities --

7 MS. CHRISTENSEN: Sure.

8 MS. HOOVER: -- and just get, you know, the
9 Panel's brief even nodding or shaking your head, and we'll
10 track that in our notes about what -- you know, the idea
11 is we want to know what you want us to include in the
12 upcoming report to the Legislature. We would like formal
13 input on that.

14 You can also email us after. That's fine. You
15 can provide input, but we'd prefer to get your input in
16 the public meeting with specific suggestions on these six.
17 We've heard some, but if you'd just click through and give
18 a nod.

19 CHAIRPERSON SCHWARZMAN: I want to -- okay. I
20 have a clarifying issue. So to me it seems like there's
21 two questions here. One is does the Panel agree with
22 these priorities and recommend that the Program include
23 them in the report to the Legislature as the Program's
24 priorities. But another parallel conversation that's
25 happening here is the budget is tight, there's less money

1 than we hoped there would be, what should the Program
2 elevate and what should it step away from? And I'm
3 confused currently about whether you need input on both at
4 the same time.

5 MS. CHRISTENSEN: Well, this was put on the
6 agenda with the thought to just the first. And it was put
7 on the agenda before we found out about our funding.

8 So, primarily, I am looking for your input on the
9 first part of your question. We have been taking notes on
10 all of your concerns and the additions suggest --
11 additional suggestions. So if there's time and you would
12 like to weigh in further on how to prioritize within this
13 set, I'm also all ears.

14 MS. HOOVER: And let me just add that in terms of
15 all the comments about budget, as before, when you
16 separately wrote a letter, brought it to the Panel for
17 signature, you can make that choice as Chair with one
18 other person. That's not something we want to talk about
19 right now.

20 CHAIRPERSON SCHWARZMAN: Right.

21 Veena.

22 PANEL MEMBER SINGLA: Veena Singla. So in terms
23 of thinking about priorities for the Leg Report, this
24 relates to what my earlier comment, which I think I
25 didn't -- I didn't say very well. But, you know, if the

1 thought is that the State would support the Program more
2 in the future, there has to be a demonstrated value of the
3 Program to those who are making those decisions.

4 So in thinking about what's going to be put
5 forward in the Leg Report, I think that's a really
6 important frame as to being able to show like what value
7 this Program has brought and will bring in the priorities
8 and information that's communicated in that report.

9 And I think in -- out of the -- these priorities,
10 there's two that stand out to me in that regard. I think
11 working with stakeholders, this is local environmental and
12 public health responses, is one. And the understanding
13 and mitigating environmental health inequities is the
14 other.

15 CHAIRPERSON SCHWARZMAN: Could you just say I got
16 the inequities is number -- here is number 2, but the
17 other one that you said was number three, right?

18 PANEL MEMBER SINGLA: (Nods head.)

19 CHAIRPERSON SCHWARZMAN: It's in our -- it's
20 numbered differently here, but it's like slide 22.

21 PANEL MEMBER SINGLA: Correct.

22 CHAIRPERSON SCHWARZMAN: All right. Okay. Just
23 for clarity.

24 Okay. I withheld my comment while I was
25 collecting them from the Panel. So I just want to say,

1 because it's a point that Jenny brought up, but I was
2 having a couple other thoughts about it, is there's this
3 inherent tension between surveillance and all the other
4 things that the Program does. And I want to acknowledge
5 like what Tom said about the Program was established with
6 a clear goal of surveillance.

7 And I agree with Jenny that in light of how the
8 Program is supported or not at this point and what the
9 realities of how surveillance is done is performed in the
10 state of -- or in the setting of really limited resources,
11 and in the context of the existence of CDC biomonitoring,
12 which doesn't accomplish state surveillance, but at least
13 does some population-level U.S. surveillance, that my
14 strong feeling is that California Biomonitoring can
15 demonstrate its value more through the number 2 that Veena
16 just flagged, conducting biomonitoring studies to better
17 understand and mitigate environmental health inequities,
18 because those are often specific to the state and to our
19 regions.

20 And the -- another one that Jenny flagged, which
21 is number 5, which is our slide 20, of increasing access
22 to the findings. It's not -- it's not the individuals
23 that I mean, because you already do a lot of individual
24 report back. I mean, the -- the policy relevant research
25 that -- where, for example, the PFAS findings could

1 support drinking water standards that are specific to the
2 State or the East Bay Diesel Biomonitoring Project could
3 support decisions about ports, and highways, and that kind
4 of thing. That that's the place that California
5 Biomonitoring could most demonstrate its value now in line
6 with what Veena is saying.

7 So although I hate to recommend that this Program
8 step away from its core, you know, reason for being when
9 it was established of surveillance, in light of the
10 Program having been essentially starved of sufficient
11 budget to do that, that's my view on it.

12 So that's not exactly an edit of the priorities,
13 but I feel like it's an important framing as you go into
14 the Leg Report. That's my view of that.

15 So with that, would you please flip through the
16 priorities that are here, and we can get -- this is not a
17 formal vote, but we want an indication from each Panel
18 member whether you think that that is a priority that
19 should be included in the Leg Report.

20 Hands. Yeah, just hands. And you're allowed to
21 vote for all of them, right? Like this is not --

22 (Laughter.)

23 CHAIRPERSON SCHWARZMAN: You don't have to choose
24 your top 3 or something. Okay.

25 Clarifying question?

1 PANEL MEMBER QUINTANA: So just to clarify, this
2 is -- I thought you said it was independent of our funding
3 problems right now. Should we vote as if this was a --

4 CHAIRPERSON SCHWARZMAN: Yes. The question is
5 the Program --

6 PANEL MEMBER QUINTANA: If we had more money, how
7 would we do the priorities? I mean, bluntly.

8 CHAIRPERSON SCHWARZMAN: Yes. The Program is
9 saying these are their priorities, do we support that?

10 MS. CHRISTENSEN: Priority one?

11 (Hands raised.)

12 CHAIRPERSON SCHWARZMAN: Does anyone -- do you
13 support?

14 Okay. Great.

15 Two.

16 MS. CHRISTENSEN: Priority 2.

17 (Hands raised.)

18 (Laughter.)

19 CHAIRPERSON SCHWARZMAN: Priority 3?

20 (Hands raised.)

21 CHAIRPERSON SCHWARZMAN: Priority 4.

22 (Hands raised.)

23 (Laughter.)

24 CHAIRPERSON SCHWARZMAN: And priority 5?

25 (Hands raised.)

1 CHAIRPERSON SCHWARZMAN: Okay. Oh, one more.

2 Sorry about that. My error.

3 Priority 6?

4 (Laughter.)

5 (Hands raised.)

6 CHAIRPERSON SCHWARZMAN: So what I see from

7 this --

8 MS. HOOVER: Six, you have to do one more time.

9 CHAIRPERSON SCHWARZMAN: Oh, yeah, I think we did

10 that.

11 Six?

12 (Hands raised.)

13 PANEL MEMBER MCKONE: Do you have half votes on

14 that?

15 (Laughter.)

16 MS. HOOVER: Okay. Great.

17 CHAIRPERSON SCHWARZMAN: A little less enthusiasm

18 for number 6, but otherwise, I would say the Program has

19 the Panel's blessing to include these draft priorities in

20 the Leg Report.

21 MS. CHRISTENSEN: Thank you. And we've listened
22 to your feedback and we'll put -- be including more in the
23 narrative in the Leg Report.

24 Great.

25 CHAIRPERSON SCHWARZMAN: Oh, the question on the

1 Panel is should we indicate, as a Panel, that there's an
2 additional interest in a priority that addresses
3 regulatory effectiveness?

4 MS. HOOVER: We heard it.

5 CHAIRPERSON SCHWARZMAN: Okay. Program heard
6 that and we don't need a show of hands it sounds like.
7 Okay. So we've accomplished what we were meant to
8 accomplish in this time.

9 Thank you. And that was a good discussion and
10 lots of thought-provoking questions.

11 We are going to go -- move on to hear about the
12 FREES Study. And so with that I'm going to introduce
13 Rebecca Moran, who is a Staff Research Associate in the
14 Department of Public Health Sciences at University of
15 California, Davis.

16 Rebecca received her Master's in Environmental
17 Health from the Harvard School of Public Health. She's
18 been a project manager at UC Davis for the last 10 years,
19 where her work focuses on the indoor environment,
20 including studies on flame retardants, reducing
21 particulate matter exposures through the use of air
22 cleaners, cleaning product use patterns, and associations
23 between biomarkers of exposure and other measures of
24 indoor environmental contaminants, such as levels in dust.

25 Rebecca will be presenting on the flame retardant

1 concentrations in house dust before and after replacing
2 foam containing furniture.

3 Thanks.

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

6 MS. MORAN: Thank you. So I'm going to be
7 talking -- closer. Okay. I'm going to be talking today
8 about a study we did at UC Davis looking at flame
9 retardant concentrations -- sorry. Okay -- looking at
10 retardant concentrations in house dust both before and
11 after participants replaced upholstered furniture with
12 flame retardant-free options in the main living area of
13 their home.

14 --o0o--

15 MS. MORAN: Thank you.

16 So our main motivation for this study was
17 California revised the State's furniture flammability
18 standard known as TB117 to -- from an open flame standard
19 to a smolder standard, which allowed manufacturers to meet
20 the standard without adding chemical flame retardants to
21 the foam and upholstered furniture. The revised standard
22 is TB117 2013. And as a result of this, consumers can now
23 purchase flame retardant-free couches for their home.

24 The main goal of our study was to determine
25 whether flame retardant concentrations in house dust

1 them known as Firemaster® 550 and other mixes of
2 organophosphate flame retardants or OPFRs. In terms of
3 this presentation, we're including both halogenated and
4 non-halogenated flame retardants in this OPFR group.

5 In 2015, TB117 2013 went into full effect,
6 allowing the manufacturers to meet a smolder standard by
7 using resistant fabrics or barrier methods and no longer
8 had to add chemical flame retardants to the foam. The new
9 furniture was tagged with a new tag that indicated whether
10 the item contained additional chemical flame retardants or
11 did not, and this was important for the logistics of our
12 study.

13 --o0o--

14 MS. MORAN: So in the study, we recruited two
15 groups. When we started in mid-2015, we started
16 recruiting participants in the Bay Area or Sacramento area
17 of Northern California. These participants had to
18 currently own a couch that was likely to contain flame
19 retardants. We were able to do a telephone screener with
20 interested participants and they had to either have a
21 tag -- a TB117 tag on their couch or know the history of
22 when their couch was purchased, so that we knew that it
23 was likely to contain these flame retardant chemicals.

24 They also had to be planning to replace their
25 couch or the foam in their couch within one year of

1 enrollment in the study. And they had to be replacing it
2 with a flame retardant-free option. This was a bit of a
3 challenge for some of the participants when we first
4 started the study. So we gave them an entire year to
5 accomplish this task.

6 Each of these participants was responsible for
7 replacing their own couch or the foam in their couch. And
8 so each household took a different amount of time to
9 either find a couch that was flame retardant-free that
10 they liked or decide whether they were going to just
11 replace the foam in their couch.

12 About a year after we started the study, we
13 recruited a second group from San Jose. All of these
14 participants lived in one of two low-income apartment
15 complexes that helped us with recruitment for the study.
16 For this group, we went down and held community meetings
17 to assist with recruitment. And these interested
18 participants were able to be screened in person. This was
19 particularly important for this group, because a lot of
20 times they didn't know the history of the couch or any of
21 the furniture in their home. It was either passed down to
22 them through many people over time or it was purchased
23 from a secondhand store.

24 So with this group, we could screen them in
25 person and go walk through the home, take a look at their

1 MS. MORAN: Each home had four visits that
2 consisted of us coming into their home, collecting a dust
3 sample from their main living room, and asking questions
4 about the furniture in their home, and doing a
5 walk-through inventory of what was in each room in their
6 home.

7 Dust was collected at a visit prior to them
8 replacing their couch, and then one at 6 months, 12
9 months, and 18 months after the couch was replaced in
10 their home.

11 So if we look at the first group that we
12 recruited, our Bay Area Sacramento group, all of their
13 pre-replacement visits occurred between July 2015 and
14 August 2016. This group, as I mentioned, took quite a
15 while to replace the couches in their home as there were
16 some logistic challenges for them. It took anywhere from
17 18 days all the way up to the year that they had to
18 replace their couch with a median time of 2.8 months.

19 The majority of participants in the study were
20 able to replace their couch in under 6 months with
21 approximately a quarter taking 7 to 12 months to replace
22 their couch or the foam in their couch.

23 All the couches were replaced between August 2015
24 and November 2016, and then their dust sample visits
25 post-replacement occurred 6 months, 12 months, and 18

1 months after they replaced the couch in their home.

2 --o0o--

3 MS. MORAN: Our second group from San Jose we
4 enrolled them about a year after we started their study.
5 And their pre-replacement visits occurred in May 2016. It
6 took us two months to arrange the logistics of gathering
7 all the orders, placing the orders, and delivery of the
8 couches. Every couch was replaced in July of 2016. They
9 had their 6, 12, and 18 month post-replacement visits.
10 And study concluded in February of 2018.

11 --o0o--

12 MS. MORAN: So overall, we enrolled 28 households
13 in the Bay Area/Sacramento group. All 28 of the
14 households completed the initial pre-replacement visit and
15 had a dust sample collected. Twenty-two of the households
16 actually completed the replacement of their couch. It
17 ended up with over half of the households replacing the
18 foam in their coach instead of the entire couch, with 8
19 households replacing the couch, and 2 actually removing a
20 couch with flame retardants from their living room.

21 So in these homes, it was interesting. One home
22 had already a flame retardant-free couch plus one that
23 contained flame retardants, so they just took the one out
24 that contained flame retardants. Another one had some
25 chairs that did not contain flame retardants. They were

1 very old chairs and so they decided to remove their couch.
2 They didn't find a replacement that was suitable for them,
3 and so that was how they stayed in the study.

4 In our -- I'm sorry, 21 of the households
5 completed the entire study in this group, making it all
6 the way to the 18-month dust collection. In our San Jose
7 group, we enrolled 14 households, 13 of those households
8 completed the initial dust sample collection visit prior
9 to replacing their couch, 11 households had their couch
10 replaced and completed the 6-month post-replacement visit,
11 and the 12-month post-replacement visit. And 8 households
12 completed the entire study.

13 This group was a little bit more challenging as
14 it was difficult to contact many of the participants in
15 between the visits, as phone numbers often changed or
16 sometimes they moved units, and we had to track them down.

17 --o0o--

18 MS. MORAN: There are many methods to collecting
19 dusts in studies such as this. This study we used the
20 Mighty-Mite Vacuum Method. This mostly collects surface
21 dust. But it uses an easily readily-available Mighty-Mite
22 Vacuum with a crevice tool attachment that comes with the
23 vacuum. Dust is collected into a cellulose extraction
24 thimble held into the crevice tool with an O ring.

25 --o0o--

1 MS. MORAN: This is a pretty standard protocol
2 for collecting dust. We collect dust from the main living
3 area of the household. And the idea is to collect the
4 equivalent of the room's floor surface area. So if
5 there's a section of the floor that's covered that you
6 can't vacuum because it's covered by furniture, you go up
7 and over the furniture. But in this study, we did not
8 want to sample the furniture, because we didn't want to
9 falsely elevate those initial dust samples that we
10 collected when the main source was going to be removed
11 from the room.

12 Typically, in this protocol, you don't go
13 underneath the furniture, so we didn't do that in this
14 study either.

15 --o0o--

16 MS. MORAN: Okay. Once the dust samples were
17 collected, they were transferred back to our lab at UC
18 Davis and stored in minus 20 freezer until they were
19 extracted and analyzed. The dust samples were sieved in a
20 106 micron sieve. And 100 milligrams of dust was
21 extracted with hexane and acetone using sonication and
22 then extracted again with acetone.

23 The samples were run through a gas chromatography
24 quadrupole time-of-flight mass spectrometer. Each run was
25 80 minutes with an increase of temperature from 35 to 325

1 degrees Celsius in electron ionization mode. The samples
2 were analyzed for 7 brominated flame retardants and 7
3 non-brominated flame retardants.

4 --o0o--

5 MS. MORAN: We have just completed the analysis
6 of all of the samples for this study. And so we only have
7 preliminary data at this point that we are going to talk
8 about today. And we're going to show data for four of the
9 most common PBDEs found in upholstered furniture and 4
10 OPFRs that are commonly shown in furniture. We'll be
11 showing PBDE 47, 99, 100, and 153, and also TCIPP, TPHP --
12 it's also know as TPP, TCEP, and TDCPP.

13 --o0o--

14 MS. MORAN: So if we just take our dust samples
15 and look at them plotted over time, on this graph we see
16 for each of these eight flame retardants that the black
17 lines show an overall decrease in concentrations between
18 the pre-replacement visit and the 18-month
19 post-replacement visit. The dashed red lines show an
20 overall increase.

21 There's not a clear picture here, but we do see
22 overall a decrease between the pre-replacement and the
23 6-months post-replacement visit. And we do see quite a
24 bit of decrease throughout the study. Again, these are
25 just preliminary results. And we haven't completed our

1 statistical analysis yet.

2 --o0o--

3 MS. MORAN: If we look at our second group, the
4 San Jose group, there are less households in this group.
5 It's a little more clear, but we do see a combination of
6 decreases and increases over the course of the study.

7 --o0o--

8 MS. MORAN: One other piece of information that
9 we had in the study was we collected some foam samples
10 from the couches that were removed from the homes from as
11 many people as we could. This was more difficult in the
12 Bay Area Sacramento group, where they were replacing their
13 own couch. There was a variable timeline to replace their
14 couch and some people were replacing the foam in their
15 couch only.

16 So we were able to get a small piece of seat
17 cushion foam from some of the couches if the participant
18 was willing and the foam was accessible. We successfully
19 got 13 seat cushion samples out of the 22 households that
20 replaced their couch.

21 The San Jose group was a little easier. Because
22 we were replacing the couch for them, we took possession
23 of their old couch when we moved the new couch in, so we
24 were able to collect as many samples as we wanted from
25 each of those couches.

1 We took a large block of the seat cushion foam.
2 We took some armrest foam and fabric samples from the seat
3 armrest, backing, and decking of the couch. And we got
4 samples from all 11 of the households that replaced their
5 couch.

6 --o0o--

7 MS. MORAN: So if we just take a look at what was
8 found in the couches themselves, we saw in the Bay Area/
9 Sacramento group in the seat cushions that we had 3
10 couches with PBDEs and many, many couches had the OPFRs.

11 --o0o--

12 MS. MORAN: But what we have noticed is when we
13 looked at what was found in the San Jose couches, here you
14 can see that the dark blue rows show what was found in the
15 seat cushion foam and the white rows show what was found
16 in the other samples taken from the couch, so the other
17 foam and fabric samples.

18 What we found interesting was we did not see
19 agreement. So in a few of the couches, PBDEs were found
20 in the other components of couch, but not in the seat
21 cushion. And in many of the couches, some of the OPFRs
22 that were not in the seat cushion were found in the other
23 components of the couch.

24 So what we know is that we had more complete
25 information about what was in the couches from the San

1 Jose group, then we do from the Bay Area group, as well as
2 having information about every couch in the San Jose group
3 compared to the Bay Area group.

4 --o0o--

5 MS. MORAN: So we wanted to look at just these
6 homes where we knew what was in the couch to see if we had
7 a clear picture. And for the San Jose homes, where we had
8 information -- more detailed information about the couch
9 and more complete information from every household that we
10 see couches where PBDEs were detected clearly declined
11 over time.

12 It's a little less clear for the OPFRs. TPHP had
13 a clear decline over time, but the other OPFRs, we are not
14 seeing a clear pattern.

15 When we look at the Bay Area group, and we plot
16 the homes where we did have a foam sample and we knew what
17 was likely in the couch, we also decided to look at a few
18 of the homes where it -- we didn't have a sample of what
19 was in the couch, and it was very obvious that they start
20 out with a very high level of some of the flame retardants
21 and they declined over time.

22 So we decided to look at both, just as an initial
23 snapshot, what could we do to fill in some of the missing
24 data? And we see a clear picture here of decline in flame
25 retardants over the course of the study.

1 --o0o--

2 MS. MORAN: Again, this is just a snapshot. We
3 have just gotten the results back. We have not yet been
4 able to return them to the participants. And we are just
5 beginning the statistical analysis for this data.

6 But so far what we've learned is that the timing
7 for people to replace the foam or replace their couch was
8 variable and complicated our logistics for completing this
9 study. But overall, we did have good completion rates for
10 the homes that replaced their own foam or bought their own
11 couch.

12 We did overall see decreases in the dust
13 concentrations after the homes replaced their couch or the
14 foam in their couch. But incorporating the information of
15 what flame retardants were detected in the actual couch
16 helped us interpret the data. This is limited by the less
17 detailed information that we have from the Bay Area group
18 and the less samples that we were able to collect in that
19 group.

20 We saw some of those unexpected increases in some
21 of the homes for some of the flame retardants. And we
22 hope to investigate this a little further using the survey
23 data that we collected and home inventories that were
24 collected as potential sources of other flame retardants
25 in the home.

1 --o0o--

2 MS. MORAN: So we'd like to thank everybody that
3 made the study possible. Our participants, we could not
4 have done this study without them. Myrto Petreas and
5 June-Soo Park analyzed all of the foam and fabric samples
6 for our couches. Arlene Blum and her group at Green
7 Science Policy were really instrumental in making this
8 study happen and aiding in recruitment of participants,
9 and all the logistics of replacing the couches in our San
10 Jose group.

11 And Katya Roudneva and Tasha Stoiber collected
12 many of the dust samples in the study. And Veronica Chin
13 at Green Science Policy Institute really spearheaded the
14 logistics of replacing all of the couches for San Jose.

15 CHAIRPERSON SCHWARZMAN: Thank you so much. We
16 have about a little over 10 minutes for questions from the
17 Panel and the audience. And this time I'm going to take
18 the Chair's prerogative to ask the first question --

19 MS. MORAN: Sure.

20 CHAIRPERSON SCHWARZMAN: -- which is
21 understanding -- thank you so much for this presentation,
22 and understanding that this is preliminary data and you
23 haven't finished working with it to the extent that you
24 will --

25 MS. MORAN: Yes.

1 CHAIRPERSON SCHWARZMAN: -- the -- looking at
2 slide 16. Slide 16, is it possible to put that back up?
3 That -- let's see San Jose results. That one, yes.

4 It's nice to see this split out, that when you
5 know there's brominated flame retardants in the coach, you
6 see the decrease --

7 MS. MORAN: Yeah.

8 CHAIRPERSON SCHWARZMAN: -- in the first 6 months
9 to a year, and -- but when there are the OPFRs, it's a lot
10 more variable.

11 MS. MORAN: Yeah.

12 CHAIRPERSON SCHWARZMAN: And I'm wondering if you
13 know, just off the top of your head, the other sources of
14 the OPFRs that might be in the house that's contributing
15 to this.

16 MS. MORAN: So that's an interesting question.
17 It's something that we hope to look into a little bit more
18 using the home inventory data that we have, what could
19 have been brought into the home that would contain these
20 other flame retardants. There's a lot of items in the
21 home that -- particularly furniture and electronics --
22 mostly the furniture that we want to look at to see what
23 potentially was brought into the home or maybe moved to a
24 different room in the home closer to the room that we were
25 sampling.

1 CHAIRPERSON SCHWARZMAN: Do you know the product
2 categories that tend to contain the OPFRs?

3 MS. MORAN: Off the top of my head, I don't know
4 that we do.

5 CHAIRPERSON SCHWARZMAN: Thank you.

6 Other questions?

7 Yeah, Veena.

8 PANEL MEMBER SINGLA: Just a comment related to
9 that is the children's products oftentimes can contain
10 these particular OPFRs. So it would be interesting to
11 see. I wonder if some of these households had babies
12 and --

13 MS. MORAN: Many of them did. Most of our
14 households had either children or grandchildren and had
15 baby products. And we did inventory what baby products
16 were in the home at each visit.

17 PANEL MEMBER SINGLA: Okay. Yeah. I think that
18 would be really interesting to look at, because the
19 strollers, high chairs, car seats, bassinet pads, sleeping
20 pads, a lot of children's products have these particular
21 flame retardants.

22 CHAIRPERSON SCHWARZMAN: Yeah.

23 MR. CHARBONNET: And just to tag onto that. This
24 is Joe Charbonnet from the Green Science Policy Institute.

25 I'll add that the organophosphate esters that we

1 see used as flame retardants are probably even more
2 abundantly used as plasticizers and plastics. So I
3 would -- I would be aware of that, that you might be
4 seeing in these applications other than just flame
5 retardants.

6 Also, they are the oxidation product of organo --
7 or of phosphites, which are antioxidants. So they might
8 be coming from a completely unanticipated source in that
9 regard, too, and they're used quite abundantly there,
10 so -- I recognize that makes your work significantly
11 harder.

12 (Laughter.)

13 CHAIRPERSON SCHWARZMAN: Thank you.

14 Other questions, panel or audience?

15 CHAIRPERSON SCHWARZMAN: Yes, in the back, but
16 you have to come up to the microphone, please.

17 MR. TENNEY: Sure. Joel Tenney with -- okay.
18 Good. Joel Tenny, Israel Chemicals.

19 How did you factor in --

20 CHAIRPERSON SCHWARZMAN: Closer, please.

21 MR. TENNEY: -- cleaning habits to something like
22 this? Do people -- did they change their behaviors after
23 they changed couches or was it consistent?

24 MS. MORAN: Sure. That's some of the data that
25 we did collect in our questionnaire was cleaning habits

1 over time and we have not looked into that at this point
2 in time.

3 MR. TENNEY: Okay. Good.

4 MS. MORAN: But we hope to.

5 CHAIRPERSON SCHWARZMAN: There was another --
6 yes, please.

7 DR. SHE: Thank you, Rebecca. I have one
8 question regarding the brominated flame retardants, you
9 know, that's 200 aligned congeners. Which one you think
10 the most dominant one? I think you didn't look at the
11 PBDE two line, which might be a dominant one, and then you
12 pick up 77, 99, 100. What's the logic behind you pick up
13 different congeners?

14 MS. MORAN: So if I understand the question
15 correctly, why did we pick to show these specific
16 congeners, is that -- was that your question?

17 DR. SHE: Yes.

18 MS. MORAN: Okay. So one of the interesting
19 things is that some studies have shown that the penta
20 mixture of PBDEs, which is primarily 47, 99, and 100 were
21 used in upholstered furniture kind of prior to the
22 mid-2000s. So those were just the ones that we chose to
23 look at initially when we looked at this data.

24 CHAIRPERSON SCHWARZMAN: Other questions?

25 Yes.

1 PANEL MEMBER QUINTANA: Hi. In some studies of
2 house dust they've done, we've used a cyclone vacuum that
3 can, you know, express the dust as -- in nanograms per
4 gram of dust or also nanograms per meter squared, so
5 loading versus concentration.

6 MS. MORAN: Like in AVS3?

7 PANEL MEMBER QUINTANA: Yeah, but -- so to get
8 back to the other question, change in behavior, it looks
9 like you did at least vacuum the same area with your
10 vacuum --

11 MS. MORAN: Yes.

12 PANEL MEMBER QUINTANA: -- and so you might look
13 at the amount of grams of dust collected as an issue
14 whether or not you did perhaps change behavior, or become
15 aware of dust or something.

16 DR. DORAN: Yes.

17 PANEL MEMBER QUINTANA: You might have that
18 variable too.

19 MS. MORAN: Yes. Yeah, we have included that as
20 well.

21 CHAIRPERSON SCHWARZMAN: Other questions and we
22 have couple minutes for discussion too, in case anyone has
23 any thoughts they want to contribute.

24 Yes, Kathleen.

25 DR. ATTFIELD: I was just going to add a comment

1 on additional sources for the TPP OPFR, that can also be a
2 phthalate substitute. So it is showing up in some
3 consumer products, like nail polish as well.

4 CHAIRPERSON SCHWARZMAN: That's the plasticizer
5 application basically, yeah.

6 DR. ATTFIELD: Yeah.

7 CHAIRPERSON SCHWARZMAN: Questions or comments?
8 And if not, we will move on to Kathleen's
9 presentation.

10 So, Kathleen Attfield is a Research Scientist in
11 the Exposure Assessment Section in the Environmental
12 Health Investigations Branch at CDPH. And we'll have
13 another 10 minutes for questions and discussion after
14 Kathleen's presentation.

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

17 DR. ATTFIELD: Good morning. Thank you very
18 much. I'm Kathleen Attfield from CDPH. And today, I'm
19 going to be talking about the biomonitoring portion of the
20 study that Rebecca just presented to us.

21 --o0o--

22 DR. ATTFIELD: So as we've heard from Rebecca,
23 the study was first conceived to be looking at dust in
24 foam in homes where people have either replaced foam in
25 their couches or the actual couches themselves.

1 And Biomonitoring California was able to
2 complement this with the addition of urine and serum
3 analyses in a subset of the people. And this portion of
4 the study was entitled the Foam Replacement Environmental
5 Exposure Study, FREES. So that's really referring to
6 biomarkers going forward, just so you know.

7 And our DTSC laboratory did the analysis of the
8 urine and the blood with the previously established
9 methods.

10 --o0o--

11 DR. ATTFIELD: So our biomonitoring analytes that
12 we were able to look at reflect many, but not all, of the
13 flame retardants that the dust study is looking at. So
14 for the polybrominated diphenyl ethers, we are going to
15 focus today on the congeners that were mentioned that
16 were -- that have been very prominent in foam furnishings.
17 So the 47, 99, 100, and 153. We did look at other
18 congeners, which I will briefly mention later.

19 For the organophosphate flame retardants, I'll be
20 presenting 3 metabolites of the 4 that Rebecca showed us
21 earlier, though they did also look at a wider range of
22 OPFRs. Just to help you navigate through all the
23 wonderful acronyms, everything that she present -- well,
24 the three that she presented, the parent metabolites, are
25 all the tri versions, the triphenyl phosphate, the Tris

1 tris(1,3-dichloroisopropyl)phosphate, tris(2-chloroethyl)
2 phosphate.

3 And what makes it rather easier for the
4 metabolites is these all break down and we look at the di
5 versions or the bi versions. So for TPP, you have 3
6 phenyl groups here and we're going to be looking at the
7 diphenyl phosphate, the DPP.

8 --oOo--

9 DR. ATTFIELD: So to quickly situate you in time
10 of what is happening with biomarkers in the flame
11 retardant realm, for the PBDEs, we know that in the United
12 States two of the formulations, the penta and the octa
13 PBDE formulations were phased out in 2005. And we are
14 seeing decreased levels of these environmentally.

15 And also, it looks like these are mostly showing
16 declines in biomarker levels, but not universally. There
17 are some more recent studies that show that maybe things
18 are beginning to plateau for some of these congeners.

19 Due to the ongoing presence in the environment of
20 these very long-lived chemicals, it does pose a challenge
21 for scientists to accurately assess and calculate the
22 biological half-lives. So we've still got quite a range
23 to get -- to have our estimates here for the BDEs 47, 99,
24 100, between 0.4 and 5.4 years; and for BDE-153 has much
25 longer half-life estimates of 3.5 to 11.7 years.

1 --o0o--

2 DR. ATTFIELD: For the OPFRs, as would be
3 expected with the timeline that Rebecca showed, these are
4 now increasing in environmental samples, since the PBDE
5 partial phase-out.

6 And it looks like that biomarkers are following
7 suit, but these are increasing in biological samples. So
8 we only have data so far from one cycle of the U.S.
9 National Health and Examination -- Nutrition and
10 Examination study from the 2013-2014 cycle. Already
11 seeing that the 4 OPFRs that Rebecca presented, their
12 metabolites are detected in over 81 percent of those
13 samples.

14 One thing to really keep in mind is the -- we've
15 got two very different classes of chemicals going on here.
16 These have much shorter half-lives. PBDE was years.
17 These are in a matter of hours. So this -- any particular
18 biomarker level you see for OPFRs is going to reflect a
19 much shorter time period and a much more recent time
20 period, so that will affect the analysis going forward
21 that I show you.

22 --o0o--

23 DR. ATTFIELD: So our objectives for this
24 analysis was to test if the changes in biological levels
25 of these flame retardants were different between the couch

1 and foam replacers and a comparison group. So the
2 wonderful thing about having this comparison group is that
3 we can hopefully account for these general population
4 trends that I just presented to you.

5 We're also going to be able to look at change
6 within people so that can help us reduce the impact of
7 between-person differences, hopefully those that might
8 reflect from perhaps, sex, race -- race or age, for
9 example.

10 --o0o--

11 DR. ATTFIELD: Our comparison group has the
12 formal title of the Intraprogram Pilot Study, IPP. I'll
13 try to call it comparison group, so it's not too many
14 acronyms. It's essentially a periodic sampling of
15 volunteers from the staff associated with Biomonitoring
16 California, OEHHA, DTSC, and CDPH. This is for testing
17 and demonstrating of our laboratory methods.

18 So, in 2016 to 2017, we were focusing on flame
19 retardants. And for the analysis that I'm doing, I have
20 removed anyone who perhaps moved or replaced their
21 furniture. So we can sort of think of them as more stable
22 group of people to compare to the FREES participants.

23 We will see that they have pretty much similar
24 demographics and we hope that they are also comparable in
25 having perhaps similar sort of environmental awareness to

1 our FREES participants that might affect aspects of
2 behavior, such as was brought up by one of the commenters.

3 --o0o--

4 DR. ATTFIELD: Our participant numbers, so we're
5 shifting from household to people. So we have 25 people
6 from the dust study that also elected to participate in
7 the biological sampling and made it to the 12-month
8 sampling point as well. Just a side note, this includes
9 the Bay Area as well as the San Jose participants, but it
10 was only 3 of the folks from the San Jose group
11 represented in the 25.

12 There's only 23 in the end that have overlap with
13 the dust samples, because there were 2 people who didn't
14 remain in the dust sampling to that 12-month timepoint.
15 Our comparison group had 28 people.

16 --o0o--

17 DR. ATTFIELD: On our participant
18 characteristics, it actually worked out that we have an
19 identical proportion of female-to-male participants, 68
20 percent female. For race, pretty similar proportions of
21 white to Asian, sort of 60 to 70 percent. A little more
22 diversity in our FREES group.

23 Now, we're going to revisit the timeline, because
24 the timing of the samples is -- makes the comparison a
25 little bit tricky.

1 --o0o--

2 DR. ATTFIELD: So for the dust we saw that there
3 was a sample taken at the pre-couch replacement. There's
4 a variable period of time before the couch replacement,
5 hence the broken line, at 6 months, 12 months, and 18
6 months.

7 --o0o--

8 DR. ATTFIELD: For our FREES population, we tried
9 to make these as contemporaneous as possible, so about the
10 same time as the pre-couch replacement, 6 months, 12
11 months and 18 months. Of note, at 6 months, we only did
12 the urine sample, so we only have OPFRs for that 6-month
13 time point.

14 --o0o--

15 DR. ATTFIELD: Now, to compare this to our IPP,
16 our comparison group, I slid down the FREES. So the first
17 sample that was taken from our comparison group was a bit
18 later. So it was sort of more time to have exactly a year
19 timespan versus the more variable time period of the
20 FREES. So a bit more around the time of the couch
21 replacement and the second sample 12 months later,
22 approximately.

23 --o0o--

24 DR. ATTFIELD: So to put that in tabular form,
25 that did work out that the time period between the two

1 samples for FREES was about 1.23 years for median and just
2 over 1 for our IPP group. The IPP group did start later
3 for our first samples, so in August of 2016. Whereas, as
4 Rebecca mentioned, it was a year time period for
5 collecting that first sample, for us September 2015 to
6 September 2016.

7 --o0o--

8 DR. ATTFIELD: Because of these small number of
9 participants and the possibility of other sources that may
10 be impacting results and these variable time periods, we
11 started out with a pretty simple way of looking at these
12 differences between the groups. So a testing of the
13 slope, so the change in concentration over time.

14 So let me visualize this for you.

15 --o0o--

16 DR. ATTFIELD: So here's a schematic of a
17 hypothetical PBDE. This is not real data.

18 (Laughter.)

19 DR. ATTFIELD: Don't get fixated on any
20 particular points here. So we're calling 0 month that
21 first measurement for this -- for the comparison group, so
22 the dots on the left are the first sample. You see the
23 slopes down to the dots on the right-hand side. Now, I'm
24 making the assumption that we're all in the phase of
25 eliminating PBDEs from our bodies using first order

1 kinetics, so we're expecting a log-linear decrease over
2 time. So that's what's pictured there.

3 --o0o--

4 DR. ATTFIELD: And then adding FREES for
5 comparison, again samples on the left are your first
6 sample time points with time before couch replacement
7 being negative months. And then on the right-hand side,
8 the second measurements and the slopes in between.

9 --o0o--

10 DR. ATTFIELD: So then we're going to be able to
11 compare the overall slopes, so that's what we're going to
12 be looking at.

13 So I'm -- one thing of note also is this is kind
14 of -- there's a bit of a conservative test, because we're
15 going to have to average in the time before that couch
16 replacement.

17 --o0o--

18 DR. ATTFIELD: So on to our preliminary results.
19 So to compare our initial concentrations of PBDEs, so here
20 I've represented the geometric means of the four
21 congeners, combining FREES and IPP together. We can't, at
22 this point in time, compare to NHANES, because they're
23 just doing pooled samples after 2003, 2004. So here, I'm
24 showing our best comparison, which is the California
25 Teachers Study. So our levels are pretty comparable to

1 what's seen there, even though we're a bit, you know,
2 later in time than the Teachers Study.

3 Quick nod to the other BDEs that were measured.
4 Pretty low frequency of detection, mostly under 12
5 percent.

6 --o0o--

7 DR. ATTFIELD: Breaking the two groups apart, our
8 FREES participants did start higher than our IPP
9 comparison group. But again, since we're looking at
10 change over time, this should hopefully not have a lot of
11 bearing.

12 --o0o--

13 DR. ATTFIELD: So now just showing that graphic
14 again, but with real data. This our BDE-47. So
15 hopefully, it should be pretty visually apparent. I'll
16 show you tables in a second. But that we do see a greater
17 change in the PBDE -- in BDE-47 for our FREES group.

18 --o0o--

19 DR. ATTFIELD: So in shifting to tabular result
20 form, just -- I'm going to switch to percent change over
21 one year. So this graphic is showing you log change, but
22 we're going to go back to raw values, so it's a little
23 easier to comprehend.

24 So for BDE-47, so that what you just saw
25 translates into about a 21 percent change for our

1 comparison group versus a 43 percent decrease for our
2 FREES population. Pretty similar in BDE-99. 100 is a bit
3 smaller of a change, 16 percent for the comparison group,
4 36 percent decrease with our FREES participants.

5 And there's actually a typo on this slide, it's
6 BDE-153 there at the bottom is -- as you'll see, it's just
7 about the same percentage of change. And that actually is
8 not much of a surprise, since it has a much longer
9 half-life for one, and it has much lower predominance in
10 the mixture that's put into foam furnishings compared to
11 the others.

12 --o0o--

13 DR. ATTFIELD: So moving on to our OPFRs, so
14 these are initial OPFR concentrations. Take this
15 comparison with a little grain of salt. They are
16 unadjusted, because we're using specific gravity in this
17 analysis, where as NHANES presents creatinine-adjusted.
18 So our levels are a little higher here for our California
19 samples. Also, it could have to do with that we're in
20 California, but also it's a later time period.

21 --o0o--

22 DR. ATTFIELD: Again, breaking these out by our
23 comparison group and FREES, we have higher levels in our
24 FREES group for the BCEP and the DPP, and pretty similar
25 levels for the BDCPP.

1 --o0o--

2 DR. ATTFIELD: So the analytical approach a
3 little different than the other one, because of these such
4 short half-lives the sort of passage of time is not really
5 going to play as big a role. We might expect an initial
6 drop and then pretty stable results, if you were to look
7 at the 6-, 12-, and 18-month values. So I'm just showing
8 you -- I'll be showing you linear regressions with
9 repeated measurements accounting for the repeated
10 measurements. And then because we do have data for FREES
11 only and have this concern about the short half-lives
12 involved, I will show you some correlations between those
13 three different measurements.

14 --o0o--

15 DR. ATTFIELD: So our first one, BCEP. So for
16 this one, we'll see that the FREES levels do go down a
17 little bit. But that is not statistically significant.
18 Whereas, for our IPP, we actually saw an increase in
19 levels of over the 0 to the 12 months, an 84 percent
20 increase.

21 --o0o--

22 DR. ATTFIELD: So we have the concern though of
23 the short half-life chemicals and what kind of variability
24 we might just sort of naturally see within people and
25 their difference sources of exposure.

1 So these -- for BCEP for the 6-, 12-, and
2 18-months samples, those had a kind of moderate level of
3 correlation about 0.59 to 0.6 state. And if you look at
4 intra-class correlations, which are the ratio of between
5 variability to the between and within variability, it's
6 about 0.57. To have excellent reliability, you'd want it
7 to be above 0.8.

8 --o0o--

9 DR. ATTFIELD: For BDCPP, we see -- for this one,
10 we actually see a significant decline in our FREES
11 participants, a 53 percent decrease, while our IPP
12 comparison group declines by about 18 percent.

13 --o0o--

14 DR. ATTFIELD: However, I'm afraid to say that it
15 has even worse correlation between the 6, 12, and 18
16 months. So again, these are some, you know, preliminary
17 look at some of these data. So there's going to be a
18 little interpretation work going forward. So the rhos the
19 correlation being between 0.3 and 0.4.

20 --o0o--

21 DR. ATTFIELD: For the DPP metabolite, our FREES
22 levels actually stayed pretty stable, while the comparison
23 group went down about 30 percent.

24 --o0o--

25 DR. ATTFIELD: These also have moderate levels

1 correlations, about 0.4, 0.5. And the ICC shows that the
2 within is rather dominant. So especially for these short
3 half-life chemicals, in addition to the intervention, we
4 need to think about what other aspects may be changing in
5 the homes and in the lives and behaviors of our
6 participants. So we also have quite an extensive
7 questionnaire for our participants, both before and after.
8 So there are some things we can begin to look at related
9 to those.

10 --o0o--

11 DR. ATTFIELD: So some very generally obvious
12 ones that people might want us to look at, just starting
13 off with those. So handwashing frequency. We didn't
14 actually see that that had much of an association with
15 initial concentrations or change over time. And we didn't
16 have many people telling us that they changed their
17 handwashing frequency. Of course, that requires them
18 being able to assess their own changes in handwashing over
19 a year.

20 Its known that PBDEs can be enriched in meat --
21 in animal products. So we did look at differences between
22 vegetarians and meat eaters. And again, this is in our
23 FREES population only, and did not see associations there,
24 nor with hours at a work computer, another possible source
25 of flame retardants into your breathed in or dermal

1 exposures of dust.

2 We did actually see an association with sleeping
3 on a foam mattress with initial PBDE concentrations. This
4 did not affect the change over time that we were looking
5 at though.

6 --o0o--

7 DR. ATTFIELD: So the sensitivity test that I
8 started to look at. Again, since it's a small "n" that
9 we're dealing with, it's not possible to put lots of
10 things into your model. But I did look at sex and race.
11 We didn't see any differences with race, and gender/sex
12 had very little bearing, though we saw a bit of a greater
13 change in BDE-99 with being female.

14 I was a little concerned to look at the fact that
15 our FREES population started higher in the PBDEs. And, of
16 course, I'm assuming a log-linear decrease, but that's an
17 assumption. So I did limit the FREES group just to those
18 with a similar range of values to the IPP. And that
19 actually didn't make -- didn't really make any change in
20 the difference there.

21 Also, looking at clustering of people in the same
22 homes, because we had about eight couples from the FREES
23 group that participated in the biomarker portion of this
24 study. There's that possibility by clustering and that
25 actually didn't end up having much of an effect. We had

1 some couples who had very similar values, and we had other
2 couples that really didn't have very similar values at
3 all.

4 --o0o--

5 DR. ATTFIELD: So this -- while we're seeing a
6 decrease in those PBDE values and sort of variable results
7 in our OPFR values, I do believe we do have a fair amount
8 of work in interpretation before we can think about saying
9 that the couch was the sole contributor to this change,
10 and that also, as we saw from Rebecca's results, not all
11 of the couches that did end up getting biopsied showed
12 PBDEs in those initial couches. So there's -- in the foam
13 of the seat cushions. So there's some work to be done to
14 look at this further.

15 So we will be coordinating with UC Davis and
16 Silent Spring to look at these and complement our
17 questionnaire data. We have some questions they don't
18 have and they have some we don't. And that will help us
19 to be able to interpret these results a little better.

20
21 --o0o--

22 DR. ATTFIELD: Some limitations. We have way
23 more questionnaire information on our FREES participants
24 than our comparison group. So that may limit our ability
25 to think about some aspects of behavior change that could

1 0.54 to 0.67. What -- again, what makes great reliability
2 is over 0.8. And that you more often see in long-life
3 half-life chemicals, such as PBDEs. So there was a study
4 looking at variability over a year of three measurements
5 and very excellent correlation over time showing between
6 mostly predominating. And ours were -- our ICCs for PBDEs
7 were like 0.81 to 0.97, so quite high similar to that.

8 --o0o--

9 DR. ATTFIELD: So to conclude, our PBDE
10 measurements, we did see them decreasing at a faster rate
11 in FREES compared to our comparison group, except for the
12 BDE-153. Our OPFR measurements shows different patterns
13 and could be complicated by their short half-lives.

14 And we're working further to understand how much
15 we can attribute this intervention to any one of those
16 particular changes.

17 --o0o--

18 DR. ATTFIELD: So I definitely would like to
19 acknowledge our participants that had a lot of work to be
20 a part of this study and the staff of Biomonitoring
21 California, and our collaborators.

22 --o0o--

23 DR ATTFIELD: And with that, I can take
24 questions.

25 CHAIRPERSON SCHWARZMAN: Questions from the Panel

1 or the audience?

2 Yeah, Ulrike.

3 PANEL MEMBER LUDERER: Thank you. That's a very
4 interesting presentation. My question is you mentioned
5 that you don't have very much data about -- from the
6 comparison group. That might explain why they had lower
7 levels to begin with of the PBDEs. But I'm wondering if
8 you had any information, you know, maybe particularly
9 about furniture with -- containing foam and presence of
10 that or if you really just don't have that information.

11 DR. ATTFIELD: We really have very little
12 information. The most we asked about the furniture again
13 was did you replace major articles of items.

14 Yeah, I mean, one thing I think is of interest is
15 the variability is lower in our comparison group. And
16 that -- you know, to be completely postulating, perhaps
17 it's, you know, having more of a shared daily environment.
18 Those of us that sort of share office space and so have
19 that sorts of dust in our environment.

20 CHAIRPERSON SCHWARZMAN: Go ahead, Jenny.

21 PANEL MEMBER QUINTANA: Very quickly. Since
22 you're looking at a home-based exposure, do you have any
23 information about how many hours they had spent in the
24 home out of the last 24 hours prior to collection of the
25 urine sample or the samples? Because that -- if they had

1 spent time away from home, that may have not
2 contributed -- the home environment might not have
3 contributed to the levels.

4 DR. ATTFIELD: Right. I actually don't think we
5 have the previous 24-hour. We do have a lot of
6 information sort of on your general patterns, you know,
7 how much you work at home versus work at other places,
8 travel in the car, travel in a plane. But I'm afraid I
9 don't think we have the last 24 hours, but I'll look, and
10 make sure. Good question.

11 CHAIRPERSON SCHWARZMAN: I had a question also
12 about your discussion of association with behaviors. It's
13 slide 33. And my question is just whether the study is
14 actually powered to detect those. You know, you found
15 basically not very many associations, except sleeping on a
16 foam mattress affecting PBDE --

17 DR. ATTFIELD: RIGHT.

18 CHAIRPERSON SCHWARZMAN: -- initial PBDE levels.

19 DR. ATTFIELD: Right. So that's a very pertinent
20 question and that is why you see four bullet points on
21 this slide, that there are many other questions, but not
22 really enough variability to really have any confidence in
23 looking at those comparisons.

24 My hesitation on handwashing frequency is a
25 little more on people's ability to accurately assess their

1 own patterns actually, than the power aspect to this
2 question. This one was powered okay. That would be more
3 my grain of salt.

4 CHAIRPERSON SCHWARZMAN: And I also wondered
5 about slide 27, where the BCEP levels go down a bit, but
6 not significantly. And I wondered if, you know, as with
7 our discussion about some of the other OPFRs, if just the
8 furniture isn't the main contributor to exposure to this
9 flame retardant?

10 DR. ATTFIELD: Right. And we haven't combined --

11 CHAIRPERSON SCHWARZMAN: Chemical in general.

12 DR. ATTFIELD: -- the foam and dust data with the
13 biomarker data yet. So I can't yet answer that question.
14 Foam is tricky, because not everybody gave a foam biopsy
15 of their couches, so -- but we will have dust to be able
16 to look at.

17 CHAIRPERSON SCHWARZMAN: And sort same for
18 anything where the FREES levels aren't changing
19 significantly compared to the comparison group for OPFRs,
20 you know, maybe -- maybe the intervention isn't the main
21 driver of that exposure.

22 DR. ATTFIELD: Oh, it's completely possible,
23 yeah.

24 CHAIRPERSON SCHWARZMAN: Other questions and
25 comments?

1 Veena.

2 PANEL MEMBER SINGLA: Just a quick comment. I
3 just wanted to say this is -- I think it's super
4 interesting and exciting results. I'm really looking
5 forward to seeing the further analysis. And I know this
6 study was a lot of work to coordinate and complete, so --

7 DR. ATTFIELD: Thank you to my predecessors.

8 PANEL MEMBER SINGLA: Yeah. So --

9 DR. ATTFIELD: I was not one of the ones that --
10 I had one field visit.

11 PANEL MEMBER SINGLA: I just wanted to offer my
12 compliments and congratulations.

13 CHAIRPERSON SCHWARZMAN: All right. Anything
14 else?

15 If we have nothing else, that means we get a few
16 extra minutes for lunch.

17 MS. HOOVER: No public comment.

18 CHAIRPERSON SCHWARZMAN: Oh, no public comment.
19 Okay.

20 So I have a couple things to say about lunch
21 break and then we'll stop. One is that we have a little
22 over an hour. We'll convene promptly at 1:25. Russ will
23 start us off at 1:25. And so there's a handout in your
24 packets with this map that shows some close by lunch
25 places to help with that.

1 And for Panel Members, just a reminder to comply
2 as usual with the Bagley-Keene requirements and not
3 discuss Panel business during lunch, and also that holds
4 for the afternoon break.

5 And with that, we'll conclude the morning session
6 and reconvene at 1:25.

7 Thanks.

8 (Off record: 12:15 p.m.)

9 (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: 1:26 p.m.)

3 CHAIRPERSON SCHWARZMAN: Thank you all for coming
4 back on time. We are going to jump right into Gina
5 Solomon's presentation. So I want to take a moment to
6 introduce her.

7 Gina Solomon is a principal investigator at the
8 Public Health Institute in Oakland and a clinical
9 professor of medicine at the University of California, San
10 Francisco. She served as the Deputy Secretary for Science
11 and Health at the California Environmental Protection
12 Agency from 2012 to 2017, and as a Senior Scientist at the
13 Natural Resources Defense Council from 1996 to 2012.

14 Gina has worked on children's environmental
15 health, reproductive toxicity, cumulative impacts and the
16 use of novel data streams to screen chemicals for
17 toxicity. She serves on multiple boards and committees at
18 the National Academy of Sciences and on the U.S. EPA Board
19 of Scientific Counselors Chemical Safety for
20 Sustainability Subcommittee. She is a former member of
21 the SGP as well.

22 Gina will be talking about an NAS report on
23 organohalogen flame retardants and chemical classes.

24 Thank you, Gina.

25 (Thereupon an overhead presentation was

1 presented as follows.)

2 DR. SOLOMON: All right. Thank you for the
3 invitation to come present before the Panel. And I'm glad
4 to be here to continue the conversation on flame
5 retardants.

6 --o0o--

7 DR. SOLOMON: So just last month, a committee of
8 the National Academies -- oh, right. This disclaimer.
9 This is not the official presentation of the committee,
10 though I did run the slides by the chair and the Academy
11 staff, so that -- and they concurred that this reflects
12 the report, but it also is tailored to this meeting and
13 this group and my opinion.

14 --o0o--

15 DR. SOLOMON: And so the Committee to address --
16 to develop a scoping plan to assess the hazards of
17 organohalogen flame retardants just finished up and the
18 report came out just last month. And this is the
19 Committee. It was actually a really -- it was my -- I
20 have to say it was my favorite National Academies
21 Committee. Am I allowed to say that?

22 (Laughter.)

23 DR. SOLOMON: It was a really interdisciplinary
24 group of people, and very enthusiastic and hard working
25 group. So people put a lot of time and thought into the

1 report which was on a very tight timeline.

2 --o0o--

3 DR. SOLOMON: And here's the picture of the front
4 of the report, but you can download it on the National
5 Academies' website. The report came into being because of
6 the Consumer Product Safety Commission, which was the
7 sponsoring agency. But it really came into being, because
8 CPSC was petitioned by a large and diverse group of
9 organizations, including those you see listed here and a
10 number of others, that requested that CPSC take a class
11 approach to organohalogen flame retardants, and in fact
12 ban them in four different categories of children's
13 related products or products that kids might be exposed to
14 in, one way or another, in the home.

15 And interestingly enough, the CPSC staff reviewed
16 the petition - this was several years ago now -
17 recommended to the Commission that the petition be denied.
18 But the Commission, at that time, did -- in 2016, approved
19 or voted to move forward with this petition. So the next
20 step was to pull together and sponsor this National
21 Academies committee to take a look at this issue and try
22 to figure out -- or describe ways to approach the task.

23 --o0o--

24 DR. SOLOMON: And as many of you know or all of
25 you know, the National Academies, you're sort of a slave

1 to your Statement of Task -- more than sort of. You are a
2 slave to the Statement of Task. And so this is the
3 Statement of Task sort of abbreviated: so surveying
4 available data for flame retardants; identifying at least
5 one approach for scientifically assessing OFRs as a class
6 for hazard assessment; and then provide a plan on how to
7 move forward.

8 But in the box is an important quote, that "CPSC
9 needs the hazard assessment plan...when executed, to be
10 readily integrated with a separate quantitative exposure
11 assessment to complete a human health risk assessment".

12 And that's an important decision context, because
13 it's very different from, for example, Biomonitoring
14 California's decision context about listing chemicals as
15 classes, where we're not expecting to have to do a risk
16 assessment of those classes that are designated or
17 prioritized.

18 --o0o--

19 DR. SOLOMON: The committee started out by
20 looking at the general idea of approaching chemicals as
21 classes. And there's a lot of, I think, pretty useful
22 language in the report describing all the reasons why
23 chemical-by-chemical risk assessment has serious problems.

24 You know, the -- and the whole row of reports at
25 the bottom all are cited to make the point that actually

1 there's an entire thread by now of NAS reports that have
2 made these points. You know, if you look at Science and
3 Decisions, which talked about where insufficient data
4 often results in this sort of unofficial default that a
5 chemical is non-toxic. There is the problem of untested
6 chemicals being substituted. And Dr. Mike Wilson's work
7 was actually cited in the report as an -- you know, where
8 one of the places that -- where that, you know, was sort
9 of developed. And then this issue of cumulative risk and
10 cumulative exposure tending to be ignored, if you're just
11 looking at one chemical at a time.

12 And so the committee concluded that a class-based
13 approach really makes a lot of sense. That there's a new
14 approach to risk assessment that needs to be developed and
15 it should be class based. So that I think was helpful.

16 --o0o--

17 DR. SOLOMON: The -- there's a sort of a nuance
18 here, which is that the class that was defined for us of
19 organohalogen flame retardants we sort of quickly looked
20 at it and went, well, okay, you know, do we have to look
21 at it all as a single class or is there the possibility of
22 looking at smaller units or subclasses for conducting a
23 hazard assessment?

24 And the committee concluded that it's still a
25 class approach, even if you break a larger class down into

1 subclasses, though, you know, there's a certain point at
2 which the subclasses become so small - and I'll get to
3 that later - that it's almost the same as doing chemical
4 by chemical.

5 --o0o--

6 DR. SOLOMON: There is a nod to Biomonitoring
7 California in the report. So you guys and OEHHA should be
8 proud of this work, because it talked about adopting the
9 class approach in the Biomonitoring Program and then how
10 that was further adopted in the Safer Consumer Products
11 program. And there's even specific language about the
12 flame retardant classes that were identified, designated
13 and prioritized by this Panel. So -- but it makes the
14 distinction that these have not been used to conduct risk
15 assessments.

16 --o0o--

17 DR. SOLOMON: So the committee laid out a
18 proposed approach to defining a chemical class, starting
19 with the question of can you define a single class? And
20 this is complicated and big, but it's not actually as bad
21 as it looks when you start to go through it.

22 Because the first question is obvious, can you
23 define a single class and can you do it based on
24 physiochemical properties, or biology, or some combination
25 of those two? And if not, then, you know, can you define

1 subclasses? And if not, then you may have to do
2 individual assessments. But if you can, then you define
3 your subclasses. You do a quick literature survey to get
4 a sense of the data availability in each of those
5 subclasses and whether there's any data at all on any
6 subclass member. And if so, then you can potentially move
7 forward and do a more in-depth hazard assessment as
8 described in the lower part of this flowchart.

9 But, you know, it's pretty straightforward and we
10 tried to actually sort of break it up into steps and then
11 do it actually, and found it to be really an interesting
12 exercise. So the first step for the flame retardants was
13 to figure out, okay, what are the flame retardants? We
14 asked CPSC. They said they couldn't provide us with a
15 list. There was a list in -- appended to the petition, so
16 we certainly looked and used that as one of the sources.
17 We actually asked the American Chemistry Council, because
18 they were very interested in engaging in the process,
19 asked them if they could give us a list of organohalogen
20 flame retardants. They were not willing to do that. So
21 we had to make our own list.

22 And so we started -- and we called that list the
23 seed set, because then we used it to generate what we
24 called an expanded set of chemical analogs that were
25 structurally similar. And then we did an exercise to see,

1 can you distinguish the chemicals that we think are being
2 used as flame retardants from otherwise somewhat similar
3 chemicals that we don't think are currently being used as
4 flame retardants. And if we couldn't designate --
5 couldn't distinguish, then it makes it a little hard to
6 call it a single class and then move forward and define
7 subclasses, which is what we ended up doing in this case.

8 --o0o--

9 DR. SOLOMON: So the seed set chemical list,
10 there's seven data sources all listed at the bottom.
11 Eastmond(2015) is the petition. The Danish EPA has done a
12 lot of really useful work on this, and we used their work
13 quite a bit. And we identified 161 organohalogen flame
14 retardants in those sources and then got rid of the
15 duplicates and mixtures and got down to 148 and published
16 that list. So that's available now out there. It's the
17 best we could do as a committee.

18 --o0o--

19 DR. SOLOMON: Then defining -- trying to define
20 similar analogs, we took the full 200,000 organohalogens
21 that are, you know, out there, used Tanimoto Similarity
22 Index threshold of 80 percent to just sort of do a cut of
23 what similar analogs are there and came up with a bit over
24 1,000. And then looked at physicochemical properties and
25 ToxPrint Chemotypes types to try to -- and I don't want to

1 get too into the details here. But it's basically this
2 idea of, well, can -- you know, can we sort of break our
3 148 out from this larger pool of over 1,000.

4 And it basically just showed that there's a lot
5 of organohalogens out there that share really pretty much
6 all the same chemical properties and structural properties
7 as the known flame retardant ones. And so they could
8 maybe in the future become flame retardants or they might
9 not, but it's -- you can't distinguish them.

10 So it was really hard to call it a scientifically
11 defined class, except by use. And use doesn't work in a
12 risk assessment context. It works in other contexts, but
13 not in a risk assessment context.

14 --o0o--

15 DR. SOLOMON: So all that is to say that we ended
16 up defining subclasses. And there's lots of different
17 ways to define subclasses. We ended up using a
18 combination of structure and biology, but we also realized
19 that you can define subclasses so narrowly that you can --
20 you know, we could have ended up with 100 -- almost 148
21 different subclasses. There's no point.

22 And so we cautioned against that and proposed
23 defining them broadly. So we looked at predicted
24 biological activity, came up with eight biology-informed
25 categories. Also, looked at different chemotypes in the

1 seed set and merged the information and ended up coming up
2 with 14 biological/structural subclasses.

3 The smallest class had four members. There could
4 have been some classes that had one or two members and we
5 ended up deciding to merge those into the most closely
6 related classes.

7 That also meant that we had some chemicals that
8 were in more than one class. That could be okay. They
9 would just be assessed maybe twice or, you know, in two
10 different classes.

11 --o0o--

12 DR. SOLOMON: And so this is our 14 subclasses.
13 And so you sort of get a sense of the -- how we sort of
14 defined them. And I don't know that there's too much we
15 want to get into there, except for you could see some of
16 the favorites there, the polyhalogenated diphenyl ethers
17 there with 12 members. Polyhalogenated organophosphates
18 just below them with 22 members and then a whole bunch of
19 other subclasses that are -- you know that we're not --
20 haven't been looking at as closely.

21 --o0o--

22 DR. SOLOMON: And in the next step, we did a data
23 survey just looking at big data sets out there.
24 Toxicogenomics Database, the EPA Chemical Dashboard,
25 Hazardous Substances Data Bank, you know, IRIS, ToxCast.

1 ChEMBL, by the way, is a UK. I wasn't familiar with that,
2 but it's a UK-based data source on chemicals.

3 And there's a much bigger table in the report,
4 but this gives you a sense of how it looks. Our eight
5 data sources going across the bottom on that X-axis. The
6 number of seed chemicals with data in each of these
7 classes. And you can see that, you know, most cases -- in
8 a lot of cases there were zero data in any given data
9 source. And in some cases, there was data on, you know,
10 one or two chemicals in the subclass. And in a few cases,
11 like the polyhalogenated organophosphates which is the
12 second row down, you see that there were -- there's, you
13 know, much more data available. Like in that Comparative
14 Toxicogenomics Database, there was data on ten of them,
15 and data -- a little data on some in most of the data
16 sources.

17 So you get a sense of more data rich versus data
18 poor subclasses by just sort of scanning this kind of
19 quick almost like a data inventory or data survey.

20 --o0o--

21 DR. SOLOMON: And so we decided to pick two
22 subclasses to focus on and to try to take further in a
23 case study. And we picked the polyhalogenated
24 organophosphates because they were relatively data rich,
25 as I showed you from the previous slide. And the

1 with fairly negative rodent data.

2 And it was really, without getting really deep
3 into each study and figuring out which ones were weak and
4 further evaluating it, we weren't able to just, you know,
5 immediately say, okay, there's consistent findings.

6 --o0o--

7 DR. SOLOMON: And so what we did, instead of
8 going deeper at this point, because this was top level
9 recommendations, we laid out options for what to do next.

10 So, you know, option 1 would be basically to say,
11 okay, you know, you extend the most conservative
12 conclusion regarding hazard to the entire subclass, and
13 that would be reasonable, though it's sort of more of a
14 policy decision. Option 2 is reclass. If you have some
15 members that are sort of borderline and they're behaving a
16 little differently, you might move them out of the class.
17 Another is to dig in more deeply to the data to try to
18 explain the discordance. It may be -- have something to
19 do with study design or study quality, and that could
20 allow the assessment to move forward. We didn't have the
21 amount of time we would have needed to do that, or
22 generate some more data that could increase clarity.

23 And we made really clear that that would not have
24 to be, you know, traditional toxicology data. It could be
25 high-throughput data. It could -- you know, that would

1 just sort of help explain the discordance.

2 --o0o--

3 DR. SOLOMON: We also laid out other possible
4 options that we saw across the classes. There were some
5 classes where there's basically no data on any member of
6 the subclass. You can't go much further if you have
7 nothing on any anything. And so there's a need to
8 generate some data or to broaden the subclass, so that
9 you're pulling -- maybe pulling in some of the non-flame
10 retardant analogs for example or reclassify into a
11 different subclass, or if you had data on just one or two
12 chemicals in the subclass and nothing at all on the rest,
13 you can make a fairly scientifically based, scientifically
14 informed policy decision to treat them all like the ones
15 with data, or try to, you know, extrapolate based on
16 predictors or generate some data on the others to allow
17 you the confidence to extrapolate, or there's the
18 data-rich subclass.

19 We really only had one example here, which was
20 the PBDEs among the flame retardants. And we actually
21 concluded that for the PBDEs, you could, with a fair
22 amount of scientific confidence, extrapolate across the
23 entire subclass a designation of "potentially hazardous",
24 which is what CPSC uses. So if you have concordant data
25 that works well.

1 --o0o--

2 DR. SOLOMON: So just to wrap-up, things that I
3 think came out of this report, a pretty strong statement
4 that a class approach to chemicals is scientifically
5 justifiable, and, in fact, useful in all kinds of decision
6 contexts, including in risk assessment. The approach to
7 forming classes may differ depending on the decision
8 context. So in risk assessment, you might have to form
9 narrower classes.

10 And then we recommended coming up with classes
11 based on a combination of chemistry and biological
12 indicators or predictors. And then we said basically if
13 the data are relatively concordant, it's perfectly
14 scientifically justifiable to extrapolate to chemicals in
15 the same subclass with no data, but that, you know, when
16 you have discordant data, it gets harder.

17 And then there was a real emphasis on using
18 predictive high-throughput toxicology approaches to help,
19 you know, extrapolate within or across classes. And the
20 discordant data I think we were all hoping that we would
21 be able to make some more -- some clearer conclusions
22 about the subclasses that we focused on. And so that was
23 a disappointment. But, you know, the results were what
24 the results were.

25 And then we, you know, only had a certain amount

1 of time to take the analysis as far as we did. So there's
2 a lot more I think that could be done to move this
3 forward, and hopefully a CHAP panel which would be the
4 next step in the CPSC process, will be able to, you know,
5 get past that hurdle and move these assessments forward.

6 So, thank you very much and I'm happy to take any
7 questions.

8 CHAIRPERSON SCHWARZMAN: Thank you, Gina. We
9 have about 10 minutes for questions, a little bit more. I
10 just wanted to start with one of my own, which is - slide
11 with the bomb, where the data are too heterogeneous or
12 inconsistent on biological activity. How do you define
13 biological activity there? That is, is it -- they have to
14 have the same endpoint or a similar mechanism, they work
15 on the same, or can it be any of those, or a combination?

16 DR. SOLOMON: It could be any of those or a
17 combination. I mean, we -- the main situation that we ran
18 into was where we had -- well, actually, we had
19 differences between the zebrafish studies and the rodent
20 studies, where the zebrafish studies were indicating
21 developmental toxicity, and the rodent studies were fairly
22 negative for developmental tox.

23 And then in the case of the bisphenols, we had,
24 especially for thyroid endpoints, we had some that were
25 positive -- some zebrafish studies that were very positive

1 and some that were negative.

2 And so, you know, it -- so they were for the same
3 endpoint and/or constellation of endpoints in pretty
4 similar -- not exactly the same methods. You know,
5 there's different methods for doing zebrafish studies.
6 And so it was just to the point that it would have taken a
7 lot more digging to figure out, okay, is there some reason
8 why the studies out of this lab were positive and that lab
9 were negative, or, you know -- and there may well be, we
10 just couldn't do it.

11 CHAIRPERSON SCHWARZMAN: So the heterogeneity
12 that you're talking about is mainly there's some that are
13 positive and some that are negative, not that you're
14 finding that within one of the classes you defined, some,
15 you know, work on this receptor versus other's work on
16 that receptor?

17 DR. SOLOMON: Not so much. Yeah, it was more --

18 CHAIRPERSON SCHWARZMAN: So it's positive versus
19 negative.

20 DR. SOLOMON: Yeah, it was more that -- though
21 that may be an explanation. There also were some possible
22 explanations, you know, people were -- again, you know,
23 you can come up with your hypotheses. It just was -- we
24 need to dig deeper to test them. So, for example, some of
25 these were much larger molecules than others. And so, you

1 know, were they actually getting into the organism. So
2 there may be a difference of in the toxicity within a
3 subclass based on molecular size with a little bit more
4 digging probably could sort that out.

5 But then it becomes a little tricky, because
6 they're all part of the same subclass. Then do you divide
7 the subclass again based on size? Maybe, but, you know,
8 then you start again slicing and dicing. And then that --
9 again, if you're trying to move forward a class concept,
10 it can start to get complicated.

11 CHAIRPERSON SCHWARZMAN: Thank you.

12 Tom.

13 PANEL MEMBER McKONE: All right. Now, it's on.

14 So I was curious about you didn't go into a deep
15 dive on the structure activity classification and binning.
16 I guess the point I'm curious about is not so much what
17 methods, because there's so many different approaches, but
18 is there a way of knowing is it like so non-specific -- I
19 mean, the different SAR or QSA -- quantitative-structure
20 activity, methods are going to do different binnings and
21 classifications. Are you concerned that somebody using
22 that, that there's such tremendous sensitivity, that it
23 might not be useful as a way to organize bins or is it
24 useful? Is there some sort of robustness that starts
25 showing up among some of the methods?

1 DR. SOLOMON: I may not be the best person to
2 answer that question. Some of the committee members who
3 are like -- you know, were more steeped in this might be
4 better. We -- the committee -- since there were several
5 people in the committee who were very versed in these
6 approaches, they actually ran -- looked at a number of
7 different tools for doing that -- you know, doing the
8 binning.

9 So we did -- you know, at least fully moved it
10 through two completely different sort of approaches, and
11 they didn't come out that different. I mean, then the
12 groups had to reconcile. And it is useful. We discovered
13 to look in a number of different databases and use a
14 number of different tools. But that again emphasizes, you
15 know, if you're going to do this, you know, our committee
16 had like top people in some of these fields that were very
17 versed in the methods.

18 But, you know, this -- and if you're going to do
19 something like this here, we would need to have more
20 expertise potentially in -- you know, like on the staff.

21 PANEL MEMBER MCKONE: I mean, just to follow up,
22 so I guess the question that you answered actually is
23 that -- is, you know, the opportunity for major
24 misclassification, right? In what you're doing, a
25 misclassification isn't the end of the world, because

1 you're just trying to get insight about organizing.

2 But the fact you said that they explored this and
3 they tried to find, you know, multiple methods, and that
4 they -- means that probably there isn't an opportunity --
5 there is not an opportunity for like a significant
6 misclassification because you explored alternative ways.

7 DR. SOLOMON: Hard to say. I mean, you know,
8 there could be misclassifications. There were calls that
9 border line and the two methods -- the methods that were
10 done were not fully consistent with each other. And so
11 there was this whole sort of resolution process where
12 things, you know, sort of decisions about where to place
13 chemicals.

14 But -- and then there's the question of, okay,
15 you know, how -- we realize we were spending quite a bit
16 of time on this and that it could become an endless
17 do-loop for an agency. You know, if an agency is trying
18 to form classes and subclasses, and then putting them out
19 for comment, and then somebody saying, no, this should be
20 in this class and that should be in this class, and then
21 you get a little more data, and then you reclassify. And
22 you might never actually do an assessment, if you're in
23 this endless classification and reclassification.

24 And so there were -- actually, the language in
25 the report saying avoid -- you know, once you settle on

1 your classes avoid reclassifying, at least until later in
2 the process. Once you're, you know, down into the hazard
3 assessment and you start -- you know, if you find
4 discordant data, you might have to reclassify some at that
5 point, but don't just kind of keep doing the exercise.

6 CHAIRPERSON SCHWARZMAN: Go ahead and then Carl.

7 PANEL MEMBER LUDERER: Thanks, Gina. That was a
8 really great talk. My question is actually about the
9 discordant data. And maybe this is, you can't say in
10 general, necessarily. But, in general, were the
11 discordant data among different chemicals within the class
12 or even, you know, for same the chemical that you had a
13 lot of discordant data or did both occur?

14 DR. SOLOMON: It was mostly different chemicals
15 in the same class. That was what was so problematic about
16 it from our perspective. It was that you, you know, have
17 two chemicals that were in the same subclass that would
18 have very -- you know, they had very different outcomes
19 in very -- sometimes in the same study. So there were a
20 number, for example, of zebrafish studies that looked at a
21 whole bunch of different flame retardants. And they --
22 you know, there were chemicals that were positive and
23 chemicals that were negative. And sometimes those had
24 been placed in the same class, so that was -- you've got
25 the same lab, the same method, the same study, different

1 findings. Can you still class them? It's a question.

2 PANEL MEMBER LUDERER: A follow-up. I mean,
3 another benefit though of this, even in that situation, if
4 you're looking more chemical by chemical, is taking into
5 account all of these data that are not the traditional
6 toxicology data, you know, animal bioassays, et cetera,
7 and really taking -- making use of all those mechanistic
8 data that haven't traditionally been used as much in
9 hazard identification.

10 CHAIRPERSON SCHWARZMAN: Carl.

11 DR. SOLOMON: Yeah. I think that came through in
12 the report loud and clear, that -- and it was -- and
13 that's going to -- it's a big shock to CPSC, because I
14 think they have been a little bit not as -- not as much
15 sort of at the forefront of adopting current methods,
16 either in risk assessment or in toxicology.

17 So when they briefed us on their risk assessment
18 methods, it was, you know, sort of consistent with how
19 things were done here quite some years ago.

20 PANEL MEMBER CRANOR: Thank you, Gina.

21 I think this is a great idea. And there may be
22 some ideas that can be borrowed from other fields that
23 help here. The National Academy took up some of their new
24 tests in November of 2017, I think, and it was just a
25 workshop. It wasn't a publication. But there, I talked

1 and suggested some ideas you can borrow from the law to
2 help organize this.

3 So in the law, the idea of a presumption is used,
4 that you have a social goal that you may want to
5 accomplish or a social goal you don't want to contravene.
6 And then you use that to organize your law, unless there's
7 evidence to the contrary. There's a rebuttable
8 presumption.

9 But, in effect, that's already been used in the
10 sciences. I think of a paper by Ron Melnick on epoxides.
11 He says, boy, we've got, you know, 5 or 6 of these that
12 are really carcinogenic. We don't know anything about the
13 rest of them. He, in effect, said, let's presume or
14 consider a default that the rest of them are pretty toxic,
15 unless there's evidence to the contrary. And so this idea
16 can be used to help organize this thought. So one
17 suggestion, comment about something you said, if a
18 substance causes reproductive problem in zebrafish but not
19 in animals, it seems to me it's a bad idea to cause
20 reproductive problems in anything.

21 And so that may put it on a warning list to
22 organize -- help organize the thoughts. And so just a
23 suggestion that I've already talked about at an event that
24 might help.

25 DR. SOLOMON: Yeah. And our option 1, if the

1 data are discordant is to make a decision to extend the
2 most conservative conclusion regarding hazard to the
3 entire subclass. So that is -- was recognized as being a
4 potentially viable approach, though it is more of a policy
5 than a -- you know, it's more a policy decision.

6 PANEL MEMBER CRANOR: Right. Well, you -- in
7 both regulatory law and science, sometimes those
8 presumptions are -- well are often called defaults. And
9 they have may be based on the science or they may be based
10 on the policy. So, for example, linearized extrapolations
11 is maybe largely policy. You don't want to underestimate
12 the risks to subpopulations and so forth. So you've got
13 two things in play there, if you keep it in mind.

14 CHAIRPERSON SCHWARZMAN: One thing I was hearing
15 with that is that the epoxides example you give is where
16 there's already an established class, right? And so
17 that's making --

18 PANEL MEMBER CRANOR: There was some -- I think
19 there was some things on his list that somebody said were
20 not -- were not epoxides, but they were derivatives of
21 benzene, for example. So there were some surprises, but
22 he had a dozen.

23 MS. HOOVER: Carl.

24 PANEL MEMBER CRANOR: I'm sorry.

25 CHAIRPERSON SCHWARZMAN: Joe, did you have a

1 question or a --

2 And I just wanted to alert everybody that we have
3 a discussion that follows this. So there will be lots
4 more chance for discussion too, but please.

5 MR. CHARBONNET: Oh, well, maybe this is better
6 for then than now.

7 So Joe Charbonnet, Green Science Policy.

8 My question relates to a lot of what's been
9 talked about. And I'm wondering if you, Gina, or anyone
10 is thinking about the EPA's recent move towards getting
11 away from animal testing and eventually phasing it out.
12 And a lot of that is being framed as animal wellness, but
13 FOIA emails recommend there may be ulterior motives, and
14 how could a dearth of in vivo data influence our ability
15 to get concordant data around classes, and their behaviors
16 in biological systems?

17 DR. SOLOMON: Well, my two cents on that is that
18 I feel that the issue of concordant versus discordant data
19 and the issue of animal testing versus higher throughput
20 approaches might be more separate, because you can end up
21 with discordant data in any kind of toxicology platform or
22 concordant data in any kind of toxicology platform. And
23 in fact, the high-throughput data can give you a little
24 more insight into mechanism and things where you're able
25 to get a better -- maybe better sense of what's going --

1 actually going on that might explain any discordance.

2 So -- but in terms of the phasing out of animal
3 testing, it's -- yeah, that's something that's a longer
4 term issue. And I think it's something that there's not a
5 consensus on, but, you know, the Toxicity Testing in the
6 21st Century Committee sort of helped launch this type of
7 approach towards using more high-throughput testing. But
8 there's plenty of language in that report that says we,
9 you know, shouldn't be getting rid of animal testing
10 certainly any time in the foreseeable future, because
11 there's all kinds of really useful information that's
12 provided in -- that -- you know, I can't speak for EPA's
13 reasoning there, because it -- there's a lot of obvious
14 gaps, as -- there have been a few studies that have come
15 out from OEHHA and also DPR looking at some of the
16 platforms like ToxCast and finding major holes. So until
17 those are addressed, it wouldn't make sense to move away
18 from animal testing for sure.

19 CHAIRPERSON SCHWARZMAN: Thank you. We can
20 continue this conversation -- did you have a question for
21 Gina?

22 PANEL MEMBER FIEHN: Yes.

23 CHAIRPERSON SCHWARZMAN: Okay. Great. We have a
24 minute.

25 PANEL MEMBER FIEHN: Oliver Fiehn.

1 I wondered about the surprise of having
2 discordant data between zebrafish and rodents. Obviously,
3 the environments, the developmental stages, many things
4 are very different. And that is true for any model
5 system. There are model systems usually used for some
6 purpose or another.

7 And, you know, I would biologically expect that.
8 You know, the rodents -- or even within the rodents, there
9 are mice, and, you know, rabbits, and there's like rats,
10 and so on. They're all -- guinea pigs. They're all
11 different. And you wouldn't even have -- they have
12 discordant data, even if it was just rodents.

13 So the question really is have you ever discussed
14 weighting of priorities within the hierarchies of data
15 that allow risk assessments?

16 DR. SOLOMON: Good question. We didn't in the
17 Committee. You know, historically, in toxicology, rodent
18 data has tended to be the gold standard for whatever
19 reasons. And, you know -- and in the situation with the
20 organophosphate flame retardants, actually the rodent data
21 were much -- much more tended to be negative than the
22 zebrafish data.

23 And we as a committee were not totally sure that
24 we believed the -- you know, all the rodent data are
25 considered a gold standard. We weren't sure we believed

1 those studies more than the zebrafish studies. And so we
2 didn't try to sort of come to any kind of weighting or
3 hierarchy of conclusions.

4 But that could be done in the next phase. We
5 basically -- our charge was very much to come up with an
6 approach. And then actually, in some ways, you know,
7 piloting the approach wasn't even required, but we thought
8 that it would be helpful to show all the steps. And so
9 the, you know, follow-on efforts are going to have to
10 really get into those kinds of questions about, okay, if
11 you truly have discordance, what are all the things to do?

12 And we came up with a set of sort of basic
13 options, but there are a lot of suboptions under those,
14 with a lot of detail, like especially option 3, which is
15 performing analyses to explain the discordance could also
16 involve, you know, coming up with, you know, decisions
17 about how to weight certain studies over others.

18 CHAIRPERSON SCHWARZMAN: Gina, thank you so much.

19 DR. SOLOMON: Thank you.

20 CHAIRPERSON SCHWARZMAN: Really appreciate that.

21 So the next thing on our agenda is a discussion
22 session that leads us up until the break, where we get to
23 think about flame retardants. And Sara Hoover is going to
24 introduce this discussion session. She's Chief of the
25 Safe Alternatives Assessment and Biomonitoring Section of

1 OEHHA, and she'll introduce what we're going to do here.

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

4 MS. HOOVER: Hi, every -- hello, everyone. Thank
5 you so much for the amazing talks. I'm so impressed and
6 it's been really fascinating.

7 The purpose of this little intro is not to
8 constrain any discussion, but just to give ideas for
9 prompting discussion, if we need them. So you can
10 consider anything from the morning or the afternoon with
11 regard to the FREES presentation, the UCD presentation,
12 and Gina's presentation. So just some ideas about things
13 you can think about that would be potentially helpful to
14 the Program.

15 If you think about the earlier presentations on
16 FREES biomonitoring results and UCD's study of dust and
17 furniture, are there any particular findings that you'd
18 like to highlight? So thinking about the work that was
19 presented. We could think about some of the lessons
20 learned from conducting this type of pretty complex
21 intervention study and what that might imply for the
22 Program going forward.

23 Are there any initial recommendations for
24 reducing exposures to flame retardants that might be drawn
25 from the preliminary results? And as we heard, you know,

1 there's a lot more analysis to be done. So do you have
2 any suggestions for additional data analysis that might
3 help inform the concept of getting recommendations out of
4 the study?

5 With regard to chemical selection, so Gina talked
6 about this work that Gail and I worked on with Gina.
7 Actually, she was a big motivator for the class work that
8 we did. On the current list of designated chemicals for
9 the Program, we include a number of flame retardant
10 classes. Brominated and chlorinated organic compounds
11 used as flame retardants, the entire class of those. We
12 also have the entire class of non-halogenated aromatic
13 phosphates. Those are not limited by their function as
14 flame retardants. It's the entire class, including any
15 function.

16 One was recently added, a non-halogenated,
17 non-aromatic flame retardant, an OPFR, that's measured by
18 CDC. So given what's on the list already, are there any
19 other classes of flame retardants that you might want to
20 point us to to consider. And one obvious example here is
21 capturing all OPFRs and not just the aromatics.

22 --o0o--

23 MS. HOOVER: In terms of future biomonitoring
24 efforts, this is something that Gina raised as a possible
25 topic. So as I just said, the class that we have on the

1 list, the brominated and chlorinated class, was
2 intentionally broad. We made it as broad as possible to
3 capture every possible member. But as Gina was just
4 talking about, there's value in potentially looking at
5 subclasses. So should we look at subclasses? Is there
6 any value in us trying to look at methods for specific
7 subclasses of organohalogen flame retardants. And I'm
8 talking about biomonitoring methods.

9 And do you have any input on what the Program
10 should prioritize going forward for future biomonitoring
11 studies of flame retardants? And I will put a caveat on
12 all of this. This is not related to resources. This is
13 related to conceptually what would be important to do,
14 given adequate resources.

15 So over to you, Meg, and feel free to use any of
16 these questions or just have an open discussion.

17 CHAIRPERSON SCHWARZMAN: Thank you.

18 I just want to ask first of all, does anyone want
19 to see these slides again? I thought they went pretty
20 fast.

21 MS. HOOVER: Sure. You can refer to them.
22 They'll stay up and you can refer back to them.

23 And now I'm telling everyone to use the mic.

24 (Laughter.)

25 MS. HOOVER: In answer to your question, I was

1 intending that we can leave these slides up. You can ask
2 Russ to move them back and forth as needed. And if, yeah,
3 you want to go through them slowly now, that would be
4 fine.

5 CHAIRPERSON SCHWARZMAN: I feel like I need a
6 little bit more time with the questions. Is that only me?

7 Everyone wants a little more time with the
8 questions. So maybe we could just leave each slide up for
9 couple minutes and then we'll give everybody a chance to
10 have some thoughts before we jump right into discussion.

11 Maybe you could move to the next slide.

12 Thanks.

13 MS. HOOVER: Let me just add, you don't have to
14 memorize this one. You have the designated list in your
15 packets and it's also on the table.

16 (Laughter.)

17 CHAIRPERSON SCHWARZMAN: Okay. Maybe it's
18 reasonable to start a discussion, at that point. Thank
19 you for the extra time.

20 One thing that I'm reflecting on just to start
21 the conversation is an issue that Gina raised in
22 presenting the NAS report, which is there are many ways to
23 think about a class, right? And one of them that we're
24 talking about here is use-specific. We're looking at the
25 chemicals that are used in a particular application, which

1 they'll have some chemical similarities, because they're
2 used to accomplish the same function, but they -- there
3 may be huge heterogeneity in the -- in every other aspect
4 of chemical structure, and performance, and biological
5 effects, and all of that.

6 And that, you know, what Gina was raising is that
7 you can't really do hazard assessment around a class of
8 chemicals that are organized by a function. And that you
9 have to do some finer subdivision about that. And if I
10 understand this discussion right, a lot of the questions
11 here are focusing around the actual function of looking at
12 flame retardants, chemicals used as flame retardants.

13 And so I just kind of wanted to highlight that,
14 because I think it's a complexity of the conversation of
15 when we bring the FREES study results together with this
16 idea about thinking about chemical classes, which is more
17 structural and biological function than it is performance.
18 That is the chemicals are grouped biological effect and by
19 structure, not because of what they do in the world.

20 And that point was underscored also earlier with
21 the OPFRs showing up in the dust, and biomonitoring
22 studies, and how hard it is to tease apart the -- you know
23 we may not be seeing some of the effects that we would
24 expect to see with furniture replacement, because of the
25 diversity of sources of exposure to those chemicals.

1 I'm not making one point here.

2 (Laughter.)

3 CHAIRPERSON SCHWARZMAN: I'm sort of
4 complexifying the conversation which may or may not be
5 helpful. But I just wanted to acknowledge those few
6 underlying tensions.

7 MS. HOOVER: Yes. I will second those
8 complexities. And I just want to clarify, you do not have
9 to slavishly stick to talking about classes of flame
10 retardants. And, in fact, that was something that Gail
11 and I confronted with the non-halogenated aromatic
12 phosphates, we specifically did not tag those as flame
13 retardants, because we felt like some of their other uses
14 were more significant.

15 Currently, we have this new tiny category --
16 well, the other complexity on our list is we defined the
17 group. We specifically called it not a class. The group
18 of brominated and chlorinated organic compounds used as
19 flame retardants, we're very well aware that it's not a
20 chemical class. That's many, many chemical classes.

21 In that are also halogenated phosphates. So we
22 have OPFRs that fall into that, because they're
23 chlorinated, for example. Now, we have a new category,
24 because CDC started measuring organophosphate flame
25 retardants. That's the group they defined. And then they

1 added, you know, one that we don't have, which is one
2 that's not chlorinated.

3 So I think that -- I mean, one of the reasons I
4 posed the question about chemical selection is just that
5 we're always interested. And I know the panel is always
6 interested in emerging. You know, I think we've captured
7 a lot just with OPFRs. We don't have all the OPFRs for
8 sure. So that's one example.

9 We wouldn't necessarily have to define them as
10 OPFRs, but are there chemicals of interest that we're not
11 capturing?

12 CHAIRPERSON SCHWARZMAN: Great. So any other --
13 more defined comments?

14 Oh, Joe, did you have something you wanted to
15 add?

16 MR. CHARBONNET: Joe Charbonnet with Green
17 Science Policy. I'm sure our stenographer is really
18 appreciating having to spell my last name three times
19 there.

20 (Laughter.)

21 MR. CHARBONNET: Just on the subject of
22 designating emerging flame retardants, I'd really love to
23 see a lot more work on the polymeric flame retardants. I
24 think that's the direction that the industry is moving in
25 a lot of ways with flame retardants, and there's very,

1 very little study done on them.

2 We know that, you know, at least in their
3 polymeric state, of course, they're -- they're less
4 likely -- they're less bioavailable. But what little
5 research has been done shows that they break down. And
6 seeing the increasingly high production volumes and
7 diverse uses of these chemicals when they first came out
8 in polystyrene insulation, but they're going other places
9 too. And no one is thinking about these.

10 And not to say that PBDEs aren't important.
11 Certainly, they are. But these are the things that are
12 going to be poisoning my children. And maybe, you know,
13 if we could think a little bit more about them and less
14 the things that poisoned my parents.

15 (Laughter.)

16 MS. HOOVER: Let me just ask you a clarifying
17 question. When you say the polymeric flame retardants,
18 can you give a few specific examples of what you mean by
19 that?

20 MR. CHARBONNET: Yeah. So the ones that seem the
21 most used right now is kind of commonly called polyFR.
22 It's polystyrene -- or it's styrene, butadiene, polymer,
23 brominated.

24 MS. HOOVER: Brominated is captured.

25 MR. CHARBONNET: Yeah, so it is. But the

1 polymers are different in a lot of ways too. So that's --

2 MS. HOOVER: I hear you and I think what you're
3 saying is you want to see more study of it and more
4 highlight. What I'm saying is partially because of how we
5 define the class, we've captured that one already, so it's
6 on our list.

7 So the other thing I should clarify for people
8 who are just looking at our list, we have the group and we
9 have footnotes, and it indicates whether it's the entire
10 group or just those listed. So on the list of brominated
11 and chlorinated, we don't have everything on the list, but
12 everything is included, whether or not it's on the list.
13 So you can feel some reassurance based on that, we've got
14 some of those.

15 MR. CHARBONNET: All right.

16 CHAIRPERSON SCHWARZMAN: But there is this
17 difference between what's designated versus is there any
18 study looking at it?

19 MS. HOOVER: Right.

20 CHAIRPERSON SCHWARZMAN: So you're asking a
21 question about designated chemicals, which enables
22 biomonitoring to look at them, but it doesn't mean that
23 there will be a study looking at it, but we're allowed to
24 recommend that.

25 MS. HOOVER: Yeah.

1 CHAIRPERSON SCHWARZMAN: So that kind of gets to
2 that point.

3 Veena.

4 PANEL MEMBER SINGLA: Yes. I'd just add to the
5 comment about the polymerics that there's -- as far as I
6 know, there's not even methods developed for biomonitoring
7 for polymerics. Very little is known even about potential
8 exposure patterns. So I think that's certainly an
9 emerging area.

10 And the other comment I wanted to make was
11 related to the morning's discussion about one of the
12 potential priorities for the Program looking at regulatory
13 efficacy and thinking about the replacement -- PBDE
14 replacement flame retardants. And I think what we saw
15 with the results from the FREES study is that with some of
16 these replacement flame retardants that are more
17 short-lived like the organophosphate flame retardants and
18 have a multitude of other uses, the exposure patterns are
19 quite complicated.

20 So thinking about if there is a way to look at
21 the California flame retardant ban that's going to be
22 coming into effect in 2020, that would be targeting a lot
23 of those replacement flame retardants and furniture,
24 children's products, mattresses, and is there a way to
25 potentially measure efficacy of that policy, you know,

1 looking at time trends?

2 We were able to see it with PBDEs, because of the
3 kinds of chemicals they are and the particular uses. Is
4 there a way we can try to look at that with the new flame
5 retardant ban that's going to be coming into effect
6 knowing that the exposures are a lot more complicated.

7 DR. WU: Well, of course, a great way to be able
8 to look at the regulatory efficacy would be to have a
9 surveillance program --

10 (Laughter.)

11 DR. WU: -- which was robust enough to include
12 things like OPFRs. And we've always wanted to include
13 additional analytes. But as we discussed this morning,
14 we're kind of going in the wrong direction.

15 But that is, I mean, just another argument for
16 having surveillance. I mean the targeted stuff is great,
17 but we can't -- we don't have anything to compare it to,
18 unless we have baseline data.

19 CHAIRPERSON SCHWARZMAN: Yeah, please.

20 PANEL MEMBER LUDERER: And actually the comment
21 that I was going to make was very similar to that, was
22 sort of in response to this -- the question about
23 recommendations for interventions from the flame retardant
24 study results that we've seen so far. And, to me, you
25 know, I think the thing that was striking, and I think

1 that -- you know, that your comment just refers back to it
2 is really showing the benefit of these like larger
3 societal level interventions. You know, we could see the
4 secular trend and the decline in PBDEs in the comparison
5 population as well, you know.

6 And so that is a, you know, I think a plea to,
7 you know, to continue doing, you know, the surveillance
8 type of measurements. And even on some of those older
9 compounds that we may think are no longer a problem just
10 to be able to continue showing the benefits of those kinds
11 of regulatory interventions.

12 DR. WU: Yeah, absolutely. I think also the
13 FREES slides when Kathleen was showing the comparisons and
14 levels between FREES and the IPP group, and NHANES from
15 like 2003/04 is the last cycle. And we don't have
16 California-specific data. And we all know that California
17 looks different in terms of flame retardant exposure.

18 So without California-specific data, yes, we
19 would turn to NHANES, but it's a really imperfect
20 comparison.

21 CHAIRPERSON SCHWARZMAN: Maybe this is a moment
22 for me to ask you, Nerissa, because one of the things that
23 was coming up for me as we have this conversation that we
24 don't want to have about the tradeoff between surveillance
25 and more targeted studies. So just to acknowledge, we'd

1 like it all, because there's separate and very important
2 roles for each.

3 But one of the things that I was running up
4 against with the surveillance is that because of previous
5 limitations, our current surveillance is like just the
6 CARE Study even unaffected by the lack of CDC funding is
7 like stretching over eight years. And the kinds of
8 changes that we see over eight years in population trends
9 in biomonitoring can be pretty dramatic. And I just
10 wondered if you have any reflections on that.

11 DR. WU: It was -- it was our goal, when we set
12 up CARE, that it would be scalable. In fact, the first
13 description we wrote of the CARE Study was that we would
14 have these eight regions, but be able to conduct
15 biomonitoring in eight regions over two to three years,
16 because we're really aware of not only that these trends
17 happen, you know, faster than the eight-year cycle might
18 be able to portray, but also because there are these time
19 trends that are then introduced, which really limits our
20 ability to do any kind of geographic comparison.

21 So we went into it hoping that we would be able
22 to demonstrate the value and the need to accelerate the
23 coverage of the CARE study from an eight-year cycle down
24 to a three-year cycle. The eight-year cycle, I will say,
25 even though it is imperfect and seems so slow, is like

1 killing our staff to try to even complete that kind of
2 work. It's -- we're in three different regions right now
3 and it's the same people doing the field work, and the epi
4 work, and the outreach work. And so, it just -- it's so
5 important to recognize how rigorous this work is and to do
6 it well, to do the field work well, and the recruitment
7 well in a way that we get representative participants. It
8 is so labor intensive. And so, even to keep CARE at the
9 level we are at, we just need more funding to do it well.

10 CHAIRPERSON SCHWARZMAN: Thank you.

11 Jenny.

12 PANEL MEMBER QUINTANA: We talked in the past a
13 little bit about trying to do surveillance using
14 previously collected samples throughout the state, and,
15 you know, there's breast milk banks at all hospitals, and
16 there's the -- you know, the alpha-fetoprotein blood
17 samples, and there's all these things that we hadn't
18 really explored very much, because of laboratory needs for
19 a really nice sample collected in a nice tube, and -- but
20 I'm wondering if we should be thinking about those again,
21 because they're already collected and a lot of data is
22 available, and could be chosen to be super representative,
23 or if you had any discussions about that kind of thing.

24 DR. WU: So I think you're referring to the MAMAS
25 study, which we started, looking at the maternal -- the

1 archived samples from the prenatal screening biobank. And
2 that is still a resource that we would like to take
3 advantage of. It's pregnant moms.

4 About 70 percent of pregnant women in California
5 come in for prenatal screening through our Genetic Disease
6 Screening Program. And that is a resource for things
7 like -- we've talked about using it for some of the new
8 PFASs or some of the new -- maybe some non-targeted
9 screening where returning of results would not be a
10 concern, and where it's kind of on the cutting edge of new
11 emerging chemicals of concern.

12 It is difficult, because we have very little
13 information on the participants themselves. There's very
14 little information available to us on the demographics.
15 And we have no information on the exposure from those
16 people, so we don't -- we can't really say very much
17 about, you know, where they might be exposed or what
18 population they represent.

19 The other thing is that the samples are gathered
20 for hormone -- hormonal and protein analyses and not for
21 environmental sampling. So we can't use them for metals,
22 because there's metal contamination in the serum separator
23 gel. It's a very small volume that's left over, so there
24 are very few analytes that we can actually look at in it.

25 There are a number of other -- yeah, it's only

1 women of reproductive age, which I know is a population of
2 concern. And it is fairly thorough coverage of
3 California, but it doesn't get to -- I mean, it doesn't
4 get to reflection of our overall population, which is a
5 goal of our surveillance.

6 PANEL MEMBER QUINTANA: So I guess my comment was
7 more general, should we spend more time looking at
8 everything like that there is and deciding what could be
9 done? Because it's so expensive to get samples, it might
10 be cheaper to do four times as many samples with less
11 information about the person than, you know, fewer
12 samples, with lots of information about the person. I
13 don't know. I'm just brainstorming here.

14 MS. HOOVER: This is Sara again. I just wanted
15 to give a pitch for the CARE study, regardless of the time
16 scale. And we're already using that data on metals. So
17 metals, you know, has been very interesting in terms of
18 looking at different populations and the different
19 exposures. Yes, there can be time trends, but you can
20 also see differences regardless of time. So it's been
21 incredibly valuable already to have CARE L.A. data to
22 compare it to a firefighter's study, to compare it to the
23 ACE Project results, which, breaking news, those will be
24 posted all on our website probably in the next week, which
25 you heard about at a past SGP meeting.

1 But, I mean, to me, I understand what everyone is
2 saying about the limitations and the costs, but it's our
3 fundamental mandate. And it's a really high priority for
4 DPH, and it's -- you know, it's the major mandate of the
5 law. So we're still going to keep plugging. And I still
6 think there's great value. In spite of the difficulties
7 with CARE, we've already seen that value.

8 Also, we get inquiries now about people wanting
9 to join the CARE Study. So that's another thing. It's
10 been a real presence for the program across the state.

11 PANEL MEMBER QUINTANA: My last comment. Sorry.

12 But I think we're skewing towards educated
13 people. I mean, it's valuable, but I'm not sure it really
14 represents the state in a way that was anticipated for the
15 State.

16 MS. HOOVER: No, I mean, like we said, we hear
17 you. We understand the limitations. And basically, I
18 mean, I just have to give a plug to Nerissa, because the
19 reason why we even have any of this is because of her
20 creativity and how do we do something with -- we don't
21 have a 10 million -- we don't have the program that was
22 envisioned. We do not have a California HANES. We cannot
23 afford a \$10 million program. So what can we do?

24 And with all of the limitations, we still are
25 getting value out of it. So that's not to say we're not

1 doing targeted studies. We are. So we're continuing on
2 targeted studies as well. You're going to hear more about
3 that in November, some of our new work with AB 617
4 communities.

5 So, yeah, I mean, we could talk about this all
6 day, so we can move on from it. But we hear you, but I
7 think we -- there's still a lot of value in it.

8 DR. SHE: One comment regarding evaluate the
9 efficacy of regulation policy on the reduce of the --
10 comment on the evaluation of the efficacy of the
11 regulation policies on the chemical exposure.

12 I think given the fact that California do not
13 have so much resource, we do need to consider the
14 paradigms. Do we need to always do the individual
15 samples? You can pool it. Otherwise, like Dr. Meg
16 mentioned, if you did eight years, you still do not have a
17 foundation on the same years after you did eight CARE
18 regions. I think the paradigm switch, especially for
19 persistent chemicals. Maybe use pooled strategies, as
20 long as you do very little samples, but you pooled, maybe
21 give you more information than we try to do with an
22 individual.

23 So each paradigm, we're supposed to address
24 different questions. CDC already do the pooled samples on
25 dioxin-related compounds. That may be one option for the

1 Program to consider.

2 CHAIRPERSON SCHWARZMAN: Veena.

3 PANEL MEMBER SINGLA: I want to go back for a
4 minute to PBDEs, because, you know, certainly agree that
5 thinking about emerging and replacement flame retardants
6 is super important. But unfortunately, the reality is
7 PBDEs are still -- we are still all exposed to PBDEs, and
8 they're not going away. And that a lot of the indications
9 we have is that in the life cycle, as more and more
10 PBDE-containing products go to landfill and disposal, that
11 communities near those disposal sites could be exposed.

12 So I think that's a -- thinking about the PBDEs
13 lifecycle and understanding that better, and which
14 communities and populations may be vulnerable to those
15 exposures would be important.

16 And somewhat related to that too is with more
17 flooding, and fires, and natural disasters, what we're
18 seeing in other places is persistent contaminants
19 mobilized by those natural events. And so that might be
20 another angle to consider with PBDEs and some of the
21 persistent flame retardants. And also trying to
22 understand flame retardant combustion byproducts, because
23 there's a lot of concern when these products burn in these
24 fires about brominated dioxins, and furans, and other
25 toxic combustion byproducts that could be produced.

1 And my third thought about priorities for flame
2 retardant studies would be to focus on infants and
3 children as a population, where we know there's higher
4 exposure patterns with PBDEs and some of the replacement
5 flame retardants. So to understand if -- if we're
6 continuing to see that pattern and if some of the policy
7 interventions may be addressing some of those exposures
8 with children's products potentially being a source of
9 some of the high exposures.

10 CHAIRPERSON SCHWARZMAN: I want to pause for a
11 second and see if there's public comment, either cards or
12 on-line?

13 MR. BARTLETT: Just give me a second. We're
14 checking. I'll flag you if there are.

15 CHAIRPERSON SCHWARZMAN: Okay. Other discussion
16 points. We have a little more time before we have to move
17 on to our next -- yeah, Gina, please.

18 DR. SOLOMON: This really relates to this -- this
19 relates to the question about whether the Program should
20 develop methods for specific subclasses of organohalogen
21 flame retardants. In some ways, I'm thinking about it a
22 little bit more broadly, which is that what the SGP has
23 tended to do is, you know, boldly move forward which has
24 been great, and designate, and prioritize entire classes.

25 But then there is this gulf - and, Meg, you

1 pointed this out - that, you know, between what is then,
2 you know, the entire class that's identified and then what
3 actually gets biomonitoring in the end. And that's defined
4 by the resources, the available lab methods, all kinds of
5 different limitations.

6 But, you know -- and again, this is in an ideal
7 world, if we were able to find more resources for it. It
8 does seem like there could be a role potentially for this
9 panel in looking -- you know, in revisiting periodically
10 some of the broad groups of chemicals, and thinking about
11 what do we know? You know, are some of these that are
12 already on the list coming up, because we think that their
13 use may be increasing. You know, is there something that
14 would make us, you know, flag specific chemicals or
15 subgroups of chemicals within these -- this larger
16 grouping to kind of try to push those forward, get a
17 little bit more attention to them?

18 And so I guess I'm just sort of wondering about
19 whether there is a role to -- at this point, to reflect a
20 little bit back on some of the big chemical classes or
21 groups, and see if -- see sort of what we've learned and
22 what we might have just sort of left behind that we might
23 still need to learn instead of kind of saying, oh, yeah,
24 that group is on the list, we're good. Because we might
25 not be. Just a thought.

1 MS. HOOVER: And I also want to say - this is
2 Sara again - Gina give us some good ideas about taking the
3 information from the NAS report. So actually Russ and I
4 have been working on looking at all the information in the
5 NAS report, seeing if there's flame retardants that we
6 should capture that are not specifically listed, so to
7 highlight more. We did some of that back in February, but
8 we're looking at that again. We're also making a list of
9 the subclasses from NAS and which of the few that we do
10 measure, which subclasses they fall into. So we are doing
11 some of that work and we can share that when it's ready.

12 CHAIRPERSON SCHWARZMAN: And is that -- Sara, are
13 you talking about designated chemicals or chemicals that
14 have been in one or more studies?

15 MS. HOOVER: I'm talking about both actually.
16 I'm talking about analyzing the designated list. So one
17 of the filters that we've used for highlighting chemicals
18 is we try to pick either well-known chemicals, you know,
19 legacy chemicals that are important, chemicals that are
20 currently produced and in use. So we don't -- you know,
21 we don't list thousands of chemicals, even though there
22 are thousands potentially in the classes.

23 So we're taking another look at the NAS chemicals
24 to potentially add more just to highlight them on the
25 list. But we're also looking at the current lab methods

1 available in ECL, for example, and what flame retardants
2 we're currently measuring, and what classes they fall into
3 by the NAS subclass classification.

4 CHAIRPERSON SCHWARZMAN: With the idea, if I
5 could extend that just for a moment, that you might
6 identify some subclasses that are not really very well
7 represented in the --

8 MS. HOOVER: There's going to be a lot. Yeah, I
9 mean, there's going to be a lot. Because the list of
10 analytes that we measure is relatively small compared to
11 the large list of flame retardants and classes. And I
12 think that an interesting -- and, you know, again, caveat,
13 we're limited by resources; methods development is
14 difficult. But maybe there will be an opportunity where
15 we have methods for certain types and there's a similar
16 class, and maybe it would be interesting and possible to
17 add something on, pending additional resources.

18 I will throw in one other plug that hasn't come
19 up that would be of interest for flame retardants, and
20 that is more non-targeted screening. And this is actually
21 an opportunity with State funding, because that was
22 something that CDC did not fund, because it's too -- it's
23 not surveillance and it's more research. So again, this
24 would be a really -- and that's something that was
25 actually highlighted in the letter that you worked on

1 about the importance of State funding in order to look at
2 that kind of information.

3 CHAIRPERSON SCHWARZMAN: Other comments?

4 Yes.

5 PANEL MEMBER QUINTANA: Just following up on
6 non-targeted analysis and what Gina said, I mean, it seems
7 to me it could be -- that could be employed to see what
8 things are up and coming, because they're being detected
9 or have you had discussions about using it to prioritize
10 what's going to be biomonitored?

11 MS. HOOVER: I'm sorry?

12 PANEL MEMBER QUINTANA: Using non-targeted
13 analysis to help prioritize and identify chemicals that
14 are perhaps being more commonly detected --

15 MS. HOOVER: Are you asking me a question or are
16 you --

17 PANEL MEMBER QUINTANA: I am asking you a
18 question.

19 MS. HOOVER: Sounds like a good proposal to me.
20 Are you asking me what I meant by non-targeted?

21 PANEL MEMBER QUINTANA: No, I'm asking you if you
22 had thought about applying the non-targeted analysis in
23 order to help prioritize new flame retardants that are
24 being used with more frequency or ones we've never seen
25 before, things like that?

1 MS. HOOVER: Yeah, I mean, that's kind of always
2 been our -- I mean, I think -- Gail and I have been
3 talking about this topic for 10 years and how exciting
4 non-targeted analyses would be for all kinds of reasons.
5 And instead of us searching the literature, trying to
6 watch for emerging chemicals, let's do some measurements
7 and see what's emerging, so -- and you heard -- you may
8 remember Sabrina's talk where they talked about some of
9 the fluorinated, you know, non-targeted screening they're
10 doing and all the fluorinated features they see. So that
11 is -- we don't have all of those. You know, we're not
12 covering all of those, so that could be a similar angle
13 potentially on some of the flame retardants or some of the
14 halogen -- you know, you'd see halogenated compounds.
15 You're not going to be looking by function. But it could
16 be a good way to look for what do we think is important.
17 Are we seeing peaks that we want to go and try to target
18 and identify?

19 CHAIRPERSON SCHWARZMAN: Go ahead.

20 PANEL MEMBER LUDERER: Yeah. I wanted to just
21 circle back a little bit to the comment that you started
22 out with about the class, as -- you know, based on use in
23 addition to chemical structure versus this idea that, you
24 know, for hazard identification, the chemical
25 similarities, as well as biological similarities, I think

1 make a lot of sense, but then I think we need to think
2 about that classes that are defined in different ways may
3 make more sense for the different applications. You know,
4 if we're talking about hazard identification versus, here,
5 we're talking about biomonitoring and looking at exposure.
6 And there, you know, if you think about, okay, flame
7 retardants, these may be very different chemicals and, you
8 know, maybe in structure, you know, obviously, but the
9 exposures may occur together. And so it makes sense to
10 group them as a class from that exposure perspective. So
11 I think that they have different uses in different
12 situations, you know, how you define your class. I just
13 wanted to bring that up.

14 CHAIRPERSON SCHWARZMAN: One question I have
15 about that for the Program is just I'm getting the sense
16 that you're using the term "group" for things that are
17 not -- wouldn't be chemical classes, is that right?

18 Other comments, or questions, or proposals,
19 ideas, musings?

20 (Laughter.)

21 CHAIRPERSON SCHWARZMAN: Yeah.

22 MS. HOOVER: Just to bring it back maybe to some
23 of the morning talks. We heard, you know, it's still very
24 preliminary, but is there anything anybody wants to raise
25 about the talks from this morning or any of the speakers

1 want to raise to say more about the work that we've
2 already done, and what we can draw from it, and where we
3 might want to go?

4 CHAIRPERSON SCHWARZMAN: I had one thought
5 about -- I really, really appreciated the -- all of the
6 work that went into both elements of the study, the dust,
7 intervention and the biomonitoring elements of the study.
8 And it's so interesting to get to see the results. And
9 one of the things that stuck with me in a sense is the
10 limitations of the hypothesis-driven research, which has
11 to do -- which I think we're mainly seeing -- we see it
12 less maybe with the PBDEs, because we know how those were
13 used. They stick around long enough that we can get a
14 good measurement.

15 But as we were seeing with the OPFRs for multiple
16 reasons, but the primary ones being short half-lives and a
17 diversity of exposure sources, that it's so much harder to
18 understand what's happening in the data. It's so much
19 harder to understand what's driving the changes you're
20 observing either in the dust or in the people. And it was
21 just making me think more about what are the right
22 applications, or what environments, and what questions are
23 best answered by an intervention study like that. Like,
24 we're all enamored of intervention studies, because we all
25 want to take a picture, make a change, and then take

1 another picture and see if it's change -- if what we
2 expected to change, changed.

3 But when the second picture is really
4 confusing --

5 (Laughter.)

6 CHAIRPERSON SCHWARZMAN: -- you know, we haven't
7 necessarily learned much. And I -- it just underscored
8 for me the importance of designing -- when looking at an
9 intervention study, choosing your -- two things. One is
10 choosing the relevant questions really carefully to make
11 sure they're ones that can -- that will be answered well
12 by an intervention study, partly looking at things like
13 the half-life of the chemical, things like that. And then
14 the other is making sure that the -- in a sense, the
15 narrowness of the questions suits the narrowness of the
16 study.

17 And the -- I think this is something we've talked
18 about a lot already with the studies. The diversity of
19 exposure sources of the OPFRs beyond flame retardancy
20 applications makes it really hard to tell when you only
21 remove one of the uses of the chemical, like that -- those
22 chemicals are used for flame retardants, but they're used
23 for many other things also. So you only remove the source
24 that's the flame retardant and it's so much harder to see
25 what's happening.

1 So anyway, it's a very sort of targeted like
2 closely design -- narrowly designed study for a reason.
3 But looking back on it, maybe the OPFRs weren't a great
4 match with the intervention. And I understand why it was
5 done that way. It makes perfect sense.

6 MS. HOOVER: Actually, I just want to throw a
7 little pitch in here for the people who designed the
8 study. This is not a surprise. This was very expected.

9 CHAIRPERSON SCHWARZMAN: Right. No, no. I'm
10 not --

11 MS. HOOVER: So -- but actually for me the -- and
12 I know --

13 CHAIRPERSON SCHWARZMAN: I'm not pointing out
14 flaws. I mean in thinking about --

15 MS. HOOVER: No. No. No. I understand. But I
16 kind of want to highlight that as a finding of the study,
17 because just the fact that you do see all -- that all over
18 the map, that's interesting. You know, that's interesting
19 to show and to try to ferret out, well, what is going on
20 here. In fact, that there were any changes seen in OPFRs
21 is actually very interesting.

22 So it's not a surprise. And we knew, in a way,
23 we always called FREES kind of a pilot. I was amazed and
24 impressed with the results so far. And I think there's
25 more to be pulled out of it. But that being said, it was

1 a very complex, difficult intervention. And I know
2 Nerissa, and maybe Kathleen, have comments on how hard it
3 was and how you would do things differently.

4 DR. WU: Well, I actually have a comment on
5 intervention studies in general. And they are a great
6 illustration of what we do, and why we do it, and how
7 people can make -- they can -- how their shopping
8 preferences or their personal choices can impact their
9 exposures. It's really immediate, very visceral kind of
10 piece of data you can give people. And that's great.

11 And as much as our work is to illustrate and
12 inform and educate people about exposure, I think
13 intervention studies -- sure, we should do a whole bunch
14 of them. I mean, even if it's not cutting edge. I mean,
15 there's been a lot of work done on pesticides when you eat
16 organic, or the HERMOSA Study was great.

17 But I mean, repeating studies like that have a
18 lot of value in terms of story telling. In terms of
19 trying to figure out the larger exposure picture and
20 answer the question of what can I do though, the FREES
21 Study was -- there are lots of things that make it maybe
22 not the greatest match for intervention. I mean, you want
23 something that is quick, so people don't have to do the
24 intervention over this really long period of time, because
25 you're going to have people falling out of compliance.

1 It has to be something easy. Replacing your
2 furniture is not as easy as, you know, having somebody
3 bring you organic meals every day. It's just a -- it's a
4 more difficult intervention. The long -- the short
5 half-lives, of course, created a whole issue.

6 So, I mean, I think it's something to be mindful
7 of that we should do studies like this, you know,
8 resources allowing, to illustrate the point of our
9 importance, but we also have to pick the right match.

10 I do want to -- I know Kathleen and Rebecca also
11 presented their data with caveats and caution. I mean,
12 what we don't -- we also don't want to be
13 over-interpreting our data and coming up with a finding
14 that says, look, this is something you can do. We don't
15 really know that yet and we don't want to recommend people
16 do something that is potentially expensive and burdensome
17 to them when we don't -- when we're not clear on what the
18 result of that is. So hopefully we'll know more about the
19 results of these.

20 CHAIRPERSON SCHWARZMAN: I appreciate that and I
21 would expand on it too to say that it's an excellent
22 story, but I would add to that story it, of course, goes
23 well beyond individuals, because when you change the flame
24 retardancy standard, it -- you don't have to change out
25 your couch, you know.

1 (Laughter.)

2 CHAIRPERSON SCHWARZMAN: If there's societal
3 solutions that that points to also. When you, you know,
4 ban a pesticide, then people don't have to make the choice
5 between which food they're going to buy and make, right?

6 DR. WU: Sure. I think it was Carl who made that
7 point earlier about individual recommendations versus
8 societal. And we, as a State Program, are not in the
9 position of lobbying or advocating for policy change. But
10 biomonitoring is often the first kind of politicizing
11 moment or awareness moment for people, where they're like
12 why is it that I have all this stuff in my body? Why is
13 it that I have to know all these names of chemicals when I
14 go shopping for things? Why is it that there are all
15 these chemicals in everyone's drinking water?

16 I mean those are questions that we want people to
17 be asking. And the ability to return results to
18 individuals, and this gets to the whole biobank and pooled
19 sample thing, our ability to tell people their individual
20 chemical story really feeds into that in a way that I
21 think pooled and biobank samples can't do.

22 CHAIRPERSON SCHWARZMAN: Yeah, I think it's very
23 useful for that. I just wanted to say it's also useful,
24 even though that's not what you're setting out to propose,
25 that other people get to take the data and say, look, we

1 could do something at a societal level that doesn't rely
2 on people making these choices for themselves.

3 DR. ATTFIELD: I was going to return to your
4 point about looking at this hypothesis-driven part of the
5 intervention. And just to put it out there that we're
6 actually going to have sort of expanded ability to look at
7 other things, because, you know, there were more people
8 than the 25 that made it to the 12-month point. We have
9 more samples at zero. We have like more than 45 people
10 who gave a sample in the comparison group. Maybe they're
11 not all matched.

12 So we're going to be able to look at other things
13 beyond just the hypothesis, perhaps ratios and
14 relationships with the dust. I think -- I think beyond
15 perhaps the sort of limits of the intervention hypothesis
16 test, there will be other good lessons on biomonitoring we
17 can learn.

18 CHAIRPERSON SCHWARZMAN: It's wonderful to hear.
19 And I know what we heard today was like the first pass at
20 the first analyses you were able to do. And so it will be
21 exciting to hear all the subsequent layers.

22 It's time for our break, but I realize I've just
23 said a lot. And so if anyone has any final thoughts,
24 that -- and I can turn the mic over for a moment.

25 In that case, we'll take a break at this point.

1 Like I said before lunch, just stay mindful of the
2 Bagley-Keene requirements and we will gather at 3:10.

3 (Off record: 2:55 p.m.)

4 (Thereupon a recess was taken.)

5 (On record: 3:10 p.m.)

6 MR. BARTLETT: If you could go ahead and sit down
7 and, we'll continue.

8 Thank you.

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

11 CHAIRPERSON SCHWARZMAN: Now, to hear our final
12 presentation about the potential designated chemicals for
13 future consideration.

14 So Shoba Iyer is a staff toxicologist in the
15 Safer Alternatives Assessment and Biomonitoring Section of
16 OEHHA. She'll present the preliminary screening of
17 quaternary ammonium compounds for possible future
18 consideration as designated chemicals. She'll also remind
19 us of the chemical groups that were previously reviewed by
20 the Panel, which could also be prioritized for
21 consideration.

22 And the point of today's present -- discussion --
23 so at a previous meeting we had requested this first
24 screening. And the point of today's conversation after
25 this presentation is to choose one preferably, or at least

1 a top two, recommendations from the Panel about which
2 chemicals to proceed with for future consideration.

3 So I'm just underscoring that because
4 panelists -- ears open, we're going to ask you for a
5 decision about this.

6 Thank you, Shoba.

7 DR. IYER: All right. This is working.

8 Yes.

9 --o0o--

10 DR. IYER: So I'll repeat a little bit of what
11 Meg just said. The purpose of this agenda item is to
12 respond to the Scientific Guidance Panel's request for a
13 preliminary screening of quaternary ammonium compounds or
14 QACs. At the March 2019 SGP meeting, the Panel expressed
15 interest in this class, noting that QACs are abundant,
16 produced in large volumes, and have known health effects.

17 We'll be inviting Panel and public input on next
18 steps, which could include future consideration of QACs as
19 potential designated chemicals. The SGP could instead
20 recommend that we follow up on another chemical class that
21 was previously screened such as a class of pesticides.

22 --o0o--

23 DR. IYER: Just as background for our discussion
24 today, these are the criteria for recommending designated
25 chemicals, which framed our preliminary research on QACs.

1 As you all know, the criteria cover these areas shown on
2 the slide. I'll remind you that these criteria are not
3 joined by the word "and". For this preliminary screen, we
4 focused our research primarily on the first criterion,
5 exposure or potential exposure to the public or specific
6 subgroups.

7 --o0o--

8 DR. IYER: In my presentation today, I'll provide
9 a description of QACs as a class. I'll cover information
10 we located on the potential for exposure, including:
11 example uses and products; volume of use and environmental
12 detections; I'll note some possible health concerns
13 associated with members of the class; and I'll talk about
14 biomonitoring information.

15 --o0o--

16 DR. IYER: The general chemical structure of QACs
17 includes the cation NR_4^+ . These compounds contain a
18 nitrogen atom with four covalent bonds. The R groups are
19 often, but not always an alkyl chain or benzyl ring.
20 These chemicals are used for a variety of applications
21 including as antimicrobials, preservatives, anti-static
22 agents, softening agents, and surfactants.

23 --o0o--

24 DR. IYER: Now, I'll show you the chemical
25 structures of some QACs. This is the general chemical

1 structure for benzylalkyldimethyl ammonium compounds, or
2 BACs. And this is the chemical structure for a specific
3 BAC. This is the general chemical structure for
4 dialkyldimethyl ammonium compounds, or DADMACs. And this
5 is the specific chemical structure for a DADMAC,
6 didecyldimethyl ammonium chloride.

7 This is the general chemical structure for
8 alkyltrimethyl ammonium compounds or ATMACs. And this is
9 the chemical structure for a specific ATMAC. The alkyl
10 chain for BACs, DADMACs, and ATMACs is typically between 8
11 and 22 carbons long.

12 --o0o--

13 DR. IYER: On this slide I'll show you the
14 chemical structures of selected QACs that do not belong to
15 any of the three subclasses I just reviewed. There are a
16 number of polymers with quaternary ammonium centers called
17 polyquaternium compounds. Shown here is an example,
18 polyquaternium 42.

19 Esterquats are another subclass of QACs, in which
20 the alkyl chains contain ester linkages. Esterquats were
21 introduced because they biodegrade more readily than
22 long-chain DADMACs, while still achieving the intended
23 chemical function. Cetylpyridinium chloride is an example
24 of a QAC containing a pyridinium ring. And the herbicides
25 diquat dibromide and paraquat dichloride are other types

1 of QACs.

2 --o0o--

3 DR. IYER: We prepared a preliminary screening
4 document that the Panel has in your packets and that we
5 posted on the Biomonitoring California website. The
6 document includes volume of use information for a variety
7 of example QACs. On this slide, I'll cover some
8 highlights on volume of QAC use.

9 Of the QACs we reviewed that have reported
10 pesticide sales in California, about half have sales of
11 more than 100,000 pounds in 2018. Of these, several had
12 sales of over 1 million pounds. The QAC pesticides we
13 reviewed that are used agriculturally in the state are
14 generally applied at lower levels. The notable exception
15 is paraquat dichloride. Over 1 million pounds were
16 applied in 2017 and it was rank number 23 of the top 100
17 pesticides applied agriculturally.

18 Of the QACs that I reviewed, the national
19 production volume for 20 of them was over 100,000 pounds
20 in 2015. Of these, 11 had production volume of over 1
21 million pounds.

22 --o0o--

23 DR. IYER: We wanted to get a feel for what kinds
24 of consumer products contained QAC ingredients. So we did
25 a little field research by visiting a couple Bay Area

1 stores. I'll now walk you through example products we
2 located containing QAC ingredients.

3 (Laughter.)

4 DR. IYER: It's not clicking.

5 MR. BARTLETT: Yeah, just a minute.

6 DR. IYER: Sorry for the technical difficulties.
7 Let me try this one more time.

8 PANEL MEMBER LUDERER: Close it. Open it again.

9 MR. BARTLETT: It won't let me close it either.

10 MS. HOOVER: Diana is coming in.

11 (Thereupon a discussion occurred off the record.)

12 DR. IYER: All right. I really want you guys to
13 see these animations. I spent a lot of time on them.

14 (Laughter.)

15 DR. IYER: So as I was saying, I'm going to walk
16 you through example products we located containing QAC
17 ingredients. Various cleaning products like disinfecting
18 surface wipes and sprays and other surface cleaners
19 include QAC ingredients. The ingredients listed here are
20 displayed as they were shown on product packaging. These
21 includes BACs, DADMACs and a polyquaternium. These
22 ingredient names come from multiple product labels.

23 Antibacterial hand soaps have QAC ingredients.
24 Benzalkonium chloride, which is a BAC, is the active
25 antibacterial ingredient and is a replacement for

1 triclosan and triclocarban in these soaps. Cetrimonium
2 chloride is a BAC with a 16-carbon alkyl chain and is
3 listed as an inactive ingredient in these hand soaps.

4 QAC ingredients are in hair conditioners.
5 Behentrimonium compounds are common ingredients on many
6 hair conditioner labels. These are ATMACs with alkyl
7 chains that are 22 carbons long. We identified QAC
8 ingredients in a variety of other personal care products,
9 like other hair care items, facial cleanser and body wash,
10 lotions, including a baby cream and mouth wash.

11 We located QAC ingredients in cosmetics. You'll
12 see that synonyms like quaternium 15 and quaternium 18 are
13 used on the product labels. Quaternium 15 is a
14 formaldehyde releaser which is its mechanism for its
15 biocidal activity.

16 Benzalkonium chloride is a common preservative in
17 eye drops. Topical antiseptics like antibacterial hand
18 wipes and antiseptic wound wash include benzalkonium
19 chloride and benzethonium chloride. We located some oral
20 antiseptics for relief of cold sores, for example, that
21 contain benzalkonium chloride. Benzalkonium chloride is
22 sometimes listed as the active antiseptic ingredient and
23 sometimes as an inactive ingredient in these products.

24 The literature we reviewed describes the use of
25 QACs in fabric softeners, but we found identifying the

1 specific QACs used in these products to be a challenge.
2 Fabric softener packaging, both the liquid and dryer sheet
3 forms, have ingredient language like, "Contains cationic
4 softeners", or, "ingredients include biodegradable fabric
5 softening agents", which is of course not specific. This
6 QAC, diethylesterdimethyl ammonium chloride, was obtained
7 from ingredient details on the manufacturer's website.
8 And it is an example of an esterquat.

9 Some pesticides used at home include QAC
10 ingredients. We located weed and grass killers at a local
11 home and garden store that contain diquat dibromide. And
12 there are swimming pool algaecides containing QAC
13 ingredients.

14 --o0o--

15 DR. IYER: So all this gives you a flavor of the
16 very broad variety of consumer products that contain QAC
17 ingredients.

18 --o0o--

19 DR. IYER: Also, they are widely used in oil and
20 gas operations, which includes hydraulic fracturing.
21 Their functional applications here include as oil field
22 biocides, emulsifiers, surfactants, corrosion inhibitors
23 and clay stabilizers.

24 --o0o--

25 DR. IYER: QACs, specifically the subclasses of

1 BACs, DADMACs, and ATMACs have been widely detected in
2 sediment, sludge, and wastewater treatment plant influent
3 and effluent. Of the studies I located that report these
4 detections, some described samples collected from the New
5 York/New Jersey area and the others were international.

6 Preliminary analyses of sediment samples
7 collected from the San Francisco Bay have been conducted
8 in Bill Arnold's lab at the University of Minnesota.
9 These are pro-bono analyses conducted for the San
10 Francisco Estuary Institute's Regional Monitoring Program
11 for Water Quality in San Francisco Bay.

12 BACs, DADMACs, and ATMACs were detected in the
13 San Francisco Bay sediment samples. And these detections
14 are comparable to what Bill Arnold's lab has observed in
15 wastewater effluent and lake sediment samples in
16 Minnesota.

17 Other environmental detections reported included
18 indoor house dust samples in Germany; air samples from a
19 hospital where QAC-containing disinfectants were being
20 used; and fish samples from Nordic countries.

21 --o0o--

22 DR. IYER: There are health concerns associated
23 with members of this class. Some QACs, including BACs,
24 didecyldimethyl ammonium chloride and quaternium 15, which
25 is a formaldehyde releaser, are linked with skin

1 irritation and sensitization.

2 Exposure to certain QACs is associated with
3 respiratory effects. Increased risk of rhinitis and
4 work-related asthma has been observed in studies of
5 hospital and janitorial staff using cleaners and
6 disinfectants with QAC ingredients.

7 The Association of Occupational and Environmental
8 Clinics includes the class of quaternary ammonium
9 compounds on their list of asthmagens. And I'll add that
10 paraquat dichloride is a known lung toxicant.

11 Reproductive toxicity has been observed in mice
12 exposed to a disinfectant that contained BACs and
13 didecyldimethyl ammonium chloride. This exposure
14 decreased fertility and impacted both male and female
15 mouse reproductive functions. Developmental effects, such
16 as decreased pup size and neural tube defects have been
17 observed in multi-generational studies of mice and rats.

18 These studies found that the neural tube defects
19 persisted in two generations after cessation of exposure
20 to the disinfectant.

21 Assays in *C. elegans* and zebrafish provided
22 evidence for reproductive and developmental effects
23 respectively, of benzalkonium chloride and benzethonium
24 chloride.

25 BACs and cetylpyridinium chloride have been found

1 to inhibit mitochondrial function in human cell culture.
2 And BACs have been found to inhibit cholesterol
3 biosynthesis in vitro.

4 Bacterial resistance to QACs is a concern
5 reported in the literature. One particular study observed
6 increased antibiotic resistance in microbes exposed to
7 BACs, and they identified resistance genes in these
8 microbial communities.

9 --o0o--

10 DR. IYER: We located very little biomonitoring
11 data. We did find literature reporting the use of
12 hydrophilic interaction liquid chromatography for
13 quantifying polar substances like QACs. Although, these
14 aren't biomonitoring studies, we located two methods
15 papers applying hydrophilic interaction liquid
16 chromatography. Whitehead et al. 2010 used this
17 chromatographic approach for detecting diquat dibromide
18 and paraquat dichloride spiked into human urine.

19 And this paper by Steuer et al. 2016 describes a
20 method for detecting phosphatidylcholine-derived QACs in
21 human plasma, blood, and urine. These compounds, which
22 are choline, betaine, L-carnitine, and
23 O-acetyl-L-carnitine are of clinical interest as
24 predictors of cardiovascular and renal disease. They are
25 not QACs, but they do contain a quaternary ammonium

1 center, so the methodology reported by this group could be
2 relevant for biomonitoring.

3 Gino Cortopassi of UC Davis, Terry Hrubec of
4 Virginia Polytechnic Institute and State University, and
5 Libin Xu of the University of Washington are collaborating
6 on a small biomonitoring study that is in progress. For
7 this study, they developed and applied a method for
8 detected benzalkonium chloride and didecyldimethyl
9 ammonium chloride in serum samples.

10 --o0o--

11 DR. IYER: Now, I'm going to transition from the
12 QACs preliminary screening portion of my talk and switch
13 gears to review previously screened chemical classes.

14 In July 2016, one of the pesticide classes we
15 screened was neonicotinoids. A publication released this
16 June by CDC authors reported biomonitoring data for four
17 neonicotinoids in NHANES. Consequently, these
18 neonicotinoids, acetamiprid, clothianidin, imidacloprid,
19 and thiacloprid are newly added to Biomonitoring
20 California's designated chemical list.

21 In July 2016, we also screened the class of
22 anilide pesticides, including propanil.

23 And in November 2016, we screened these chemical
24 classes used in UV applications, benzophenones and
25 phenolic benzotriazoles.

1 --o0o--

2 DR. IYER: I'm now going to lay out the options
3 for the Panel. The SGP could request that OEHHA prepare a
4 potential designated chemical document on QACs. The Panel
5 could request that OEHHA prepare a potential designated
6 chemical document on a previously screened chemical class.
7 They could advise no further action on any of these
8 classes or suggest other chemical classes for possible
9 consideration.

10 I'm happy to take any clarifying questions.

11 CHAIRPERSON SCHWARZMAN: Thank you so much for
12 that presentation.

13 I have one question to launch the clarifying
14 questions section, which is -- you may not know this yet,
15 because it might require preparing a potential designated
16 chemical document. But from what you've learned so far --
17 so there's a diversity of QACs obviously, a large
18 diversity of QACs, do you have any sense for how many
19 biomonitoring analytical methods would be required to
20 analyze a sample for QACs? You know, if we're just
21 interested in QACs, but there's a lot of them, are
22 there -- the methods that you've described here sounds
23 like captures a couple at least or several. Do you have a
24 sense for the scale difference between the diversity of
25 QACs and the analytical methods that would be required to

1 detect them?

2 DR. IYER: That's a good question. I'm not sure.
3 I think it would require looking in more depth at the
4 literature, if this hydrophilic interaction liquid
5 chromatography approach is similar to maybe what's used in
6 environmental detections, which is a body of the
7 literature that I found -- that's most of the literature I
8 was easily able to find on QACs. So, yeah, it would take
9 a little more digging to see.

10 CHAIRPERSON SCHWARZMAN: And when they're
11 detecting them environmentally, are there -- do they have
12 good ways of grouping those detection analytical
13 processes?

14 DR. IYER: That's a good question. I'm wondering
15 if anyone --

16 CHAIRPERSON SCHWARZMAN: Yeah. Someone here who
17 has something to say about that.

18 DR. IYER: Some more about the technical details
19 might respond to that.

20 DR. DATTA: So the way that --

21 CHAIRPERSON SCHWARZMAN: Can you state your name?

22 DR. DATTA: I'm Sandipan Datta. I'm a researcher
23 from UC Davis. I've been researching on QACs bioactivity.
24 So basically -- I have a pharmaceutical sciences
25 background.

1 So QACs, depending on their chemical structure,
2 so when you determine the thing, it's like kind of a
3 general thing -- general procedure that you do. And then
4 you spike the necessary QACs and see when it comes up and
5 like what fragmentation it gives. And then you just look
6 for that particular signature.

7 So I'm assuming the general overall procedure is
8 going to be the same. It's just you put in whatever you
9 want to look for, see its signature coming up through the
10 LC-MS, and see if you can get that same signature coming
11 up in your samples.

12 CHAIRPERSON SCHWARZMAN: And is there significant
13 variation about the matrix you would have to evaluate,
14 like blood, serum, urine?

15 DR. DATTA: Yes. So like each matrix needs to be
16 standardized and you need to develop a standard curve of
17 the species of interest of QACs. And then you can -- you
18 go for it, like you can do that.

19 CHAIRPERSON SCHWARZMAN: And did you have -- oh,
20 Oliver and then Anne.

21 PANEL MEMBER FIEHN: We frequently see those in
22 untargeted assays. So usually five to ten different ones
23 without even looking, without the dedication, just by --
24 they show up in basically many, many matrices.

25 DR. DOHERTY: This is Anne Cooper Doherty with

1 DTSC. And I did my thesis on this however many years ago.

2 Is it working?

3 Okay. I did my thesis on QACs back in New York.
4 So we did the -- some of the environmental analyses. And
5 we could extract BACs, B-A-Cs, ATMACs, and the DADMACs
6 from C8 to C18, in one extraction and run it with just two
7 different dilutions and one method, and we were able to do
8 it. The extraction could get a little dicey, because it's
9 such a broad range of chemical properties, but we were
10 able to do it for at least sediment and water.

11 CHAIRPERSON SCHWARZMAN: Thank you. Really
12 helpful.

13 Other clarifying questions?

14 DR. CORTOPASSI: Yeah. I'm Gino Cortopassi.
15 We've been studying the mitochondrial effects of the QAC.

16 CHAIRPERSON SCHWARZMAN: Can you hold your mic
17 higher.

18 DR. CORTOPASSI: Sorry. Sorry about that.

19 We've been studying the mitochondrial effects of
20 these QACs. And in this study with Terry Hrubec in
21 Virginia and Libin Xu in University of Washington, we
22 found that there was about -- there was about -- in a
23 third of -- so we looked at 40 college students' blood
24 from them. And in about a third of them, there was
25 detectable QACs -- BAC and the DDAC at the 10 to 150

1 nanomolar level, so -- and these are college students who
2 may not have been exposed to cleaning materials.

3 (Laughter.)

4 DR. CORTOPASSI: If they're like my college
5 students.

6 (Laughter.)

7 DR. CORTOPASSI: So that's our kind of first
8 estimate of -- that's our first estimate of the level in
9 people, because it's never -- Oliver has -- finds it in
10 matrices, but it's never been systematically looked at in
11 humans what is the QAC level. So it's been assumed for 60
12 years, because they've been used as disinfectants for 60
13 years that they're used topically and they don't get
14 inside to the body.

15 But they do aerosolize and they do cause repro
16 tox and neurotox as aerosols. And so we looked in a
17 systematic way. And there is a 10 to 150 nanomolar level
18 of these in college students.

19 CHAIRPERSON SCHWARZMAN: Any other questions for
20 Shoba?

21 Great. Thank you so much for the -- oh, sorry,
22 Veena.

23 PANEL MEMBER SINGLA: Picking up a little bit on
24 that comment. Is there a much known about potential
25 exposure pathways from some of the products you've talked

1 about in terms of inhalation or dermal absorption?

2 DR. IYER: I didn't specifically review
3 literature for that, but in examining the different types
4 of products that they're in, you know, I can make like
5 inferences. My guess is with cleaning products,
6 particularly the sprays or I located scented disinfectant
7 sprays, so that seems like it would be a likely source of
8 higher exposure compared to I might think dermal.

9 But, you know, there's also -- some of the
10 products I identified were like mouthwash, or the oral gel
11 pain relievers where you might get oral exposure in those
12 instances too. So the information I have is coming from
13 the types of products we identified.

14 CHAIRPERSON SCHWARZMAN: Great. Thank you so
15 much for that, Shoba.

16 Other things might occur, but you're off the hook
17 for the moment.

18 So we have some time now to have a conversation
19 as a Panel. And the questions that the Program would like
20 us to answer are essentially what next steps, if any, the
21 Program should take on quaternary ammonium compounds, and
22 also considering the chemical groups that were previously
23 screened, which may be we could end up back on that slide.

24 Russ, if you wouldn't mind, the list that
25 includes the other chemical classes that were screened --

1 groups -- excuse me, chemical groups.

2 MR. BARTLETT: It's on 15. Okay.

3 CHAIRPERSON SCHWARZMAN: Great. Thank you.

4 So because the Program would like a
5 recommendation from each of the Panel members about kind
6 of top pick or top two picks for the groups of chemicals
7 to proceed with taking to the next stage, and so this --
8 we have a chance now for discussion of that.

9 Ulrike, did you want to start?

10 PANEL MEMBER LUDERER: Okay. Quick question
11 actually. So the question is about the neonicotinoids.
12 So those four aren't on the designated chemical list. So
13 is the question for us whether the designated list should
14 be expanded to include all neonicotinoids, or whether it's
15 to move those to the priority list?

16 MS. HOOVER: No. I mean, we are -- so this
17 particular item is about which potential designated
18 chemical document do you want us to work on next. That's
19 it. So the reason why we let you know about this, which
20 was breaking news to us, is that we've now captured some
21 of the major neonicotinoids on the designated list.

22 Now, it's not the class, so that would be a
23 possible suggestion. If you want us to do the entire
24 class, that would broaden the listing. So, yeah, we just
25 want you -- you all at the last meeting felt QACs are

1 really important, but others raised what about the
2 pesticides we'd screened. So here's your chance to say
3 here's what we want you to pick for our one document next
4 year. So that's the concept.

5 PANEL MEMBER LUDERER: Thank you.

6 CHAIRPERSON SCHWARZMAN: I was previously pretty
7 interested in the chemicals used in UV applications. And
8 in this process, though, I'm having a little bit of a
9 sense of like what could Biomonitoring California add?
10 And there's -- given how little there is happening with
11 quaternary ammonium compounds, and in light of their large
12 volume in commerce, their diversity of exposure sources,
13 the -- those two are at such opposite ends of the spectrum
14 how much we know about their occurrence in people and the
15 environment versus how frequently they're used and in
16 such -- so many different applications that I'm very
17 interested in that.

18 And I'm also kind of reflecting -- I appreciate
19 this list and the sort of update of what's happening in
20 each of these categories, because the -- some of the
21 chemicals used in UV applications are increasingly
22 being -- like people are moving away from them partly to
23 do with some of the bans that are happening around
24 sunscreens like in Hawaii and other states that are
25 picking that up.

1 And while there's some interesting changes that
2 could be potentially tracked from that, I -- it's kind of
3 tipping me a little bit towards the QACs. Anyway, I'd be
4 happy for other people's ideas.

5 Carl.

6 PANEL MEMBER CRANOR: Okay. It's live.

7 Given what Sara said and given this in front of
8 us, I guess the question is does this overburden the
9 staff? It does seem to me that the presentation that was
10 just made was, in some respects, shocking. We should
11 just, you know, find out more about that, but don't want
12 to overburden you, so...

13 CHAIRPERSON SCHWARZMAN: Well, I think we have
14 our pick, right? We can choose one.

15 PANEL MEMBER CRANOR: Okay.

16 CHAIRPERSON SCHWARZMAN: We can choose one.
17 That's why we're having the discussion --

18 (Laughter.)

19 CHAIRPERSON SCHWARZMAN: -- is we can choose, do
20 we want to suggest that the Program proceed with the next
21 step on the QACs, or do we want to have them go back and
22 do the neonics at the next stage, or et cetera.

23 MS. HOOVER: I can tell you that Shoba has done
24 an amazing job already gathering information on QACs. So
25 no, that would not overburden us, if you picked QACs.

1 (Laughter.)

2 CHAIRPERSON SCHWARZMAN: Oliver.

3 PANEL MEMBER FIEHN: Yeah. This Committee
4 doesn't like to pick one.

5 (Laughter.)

6 PANEL MEMBER FIEHN: I think we can say that,
7 because we are always concerned, concerned scientists
8 here.

9 But if I look at those, I am mostly concerned
10 about chemicals that are produced in very high doses and
11 have direct contact to humans. That is what I am very
12 concerned. Now, QACs are made to be biologically active.
13 That's their purpose. And we get into the high contact
14 and they get into the body.

15 I am most concerned about the QACs, and I would
16 favor these to be prioritized. It doesn't mean that any
17 of the others, including the UV protectants, are less
18 important, because they also get into contact with humans
19 directly.

20 Neonics are also important as we had learned
21 before. You know, but if their just basic tonnage is
22 lower and they're not directly applied usually. So if I
23 had to pick one and we -- as I said, we don't like to pick
24 one --

25 (Laughter.)

1 PANEL MEMBER FIEHN: -- that would be my
2 priority.

3 CHAIRPERSON SCHWARZMAN: Thank you. You're
4 starting us off on our march down the Panel, which is
5 ultimately what we'd like to do and hear each person's
6 priorities.

7 PANEL MEMBER SINGLA: I don't have too much to
8 add to that, except to say that's my feeling too with the
9 QACs. I'm favoring those, but with the UV chemicals
10 coming in very close behind.

11 CHAIRPERSON SCHWARZMAN: And since Tom was
12 sitting between these two, I will note that he -- because
13 he had to leave, he put in his vote -- not vote, but he --
14 (Laughter.)

15 CHAIRPERSON SCHWARZMAN: -- he weighed in earlier
16 in favor of a further assessment of the QACs.
17 Go ahead.

18 PANEL MEMBER LUDERER: Well, I'm going to do the
19 same thing, and also just to really highlight the many
20 occupational exposures and opportunities for, you know,
21 studies of occupational worker populations, you know,
22 cleaners, and other workers who work with these things
23 every day and are exposed to them by dermal exposure and
24 inhalation.

25 CHAIRPERSON SCHWARZMAN: Jenny.

1 PANEL MEMBER QUINTANA: I have even less to add.

2 (Laughter.)

3 PANEL MEMBER QUINTANA: So I agree with all of
4 the previous speakers, and especially the occupational
5 piece is a very important and vulnerable population.

6 PANEL MEMBER CRANOR: I wasn't present maybe for
7 some of these other discussions, so it's a bit unfair
8 comparison, but I was strongly impressed with the
9 presentation that was just done, and the -- was it Veena
10 or with the point of close --

11 MS. HOOVER: Mic.

12 PANEL MEMBER CRANOR: Sorry -- the point about
13 close human exposures strikes me as quite important. So
14 I'd favor that.

15 CHAIRPERSON SCHWARZMAN: So that's what you
16 needed, right?

17 Okay. We accomplished our goal.

18 Sara is happy. We're all happy.

19 (Laughter.)

20 CHAIRPERSON SCHWARZMAN: Okay. I want -- we're a
21 little ahead of schedule. I want to check now for open
22 public comment, because now is the time where we can have
23 comment to the Program on any topic relevant to the
24 Program, not just to the advancement of QACs or any other
25 chemical class toward potential designated chemicals. So

1 let's -- let me leave a moment here to make sure we're not
2 missing requests for public comment.

3 MR. BARTLETT: Nothing online.

4 CHAIRPERSON SCHWARZMAN: Okay. Nothing online.
5 Anything else in the room?

6 Please. You'll need a microphone.

7 DR. DATTA: So I'm Sandipan Datta. And I'm a
8 researcher at UC Davis. So I was just wondering like what
9 are the next steps, like once you have something as a
10 designated chemical, like what is the next -- what are the
11 next steps that you take in terms of like the designated
12 chemicals?

13 CHAIRPERSON SCHWARZMAN: So let me summarize
14 something briefly and then Program staff can chime in if I
15 get something wrong. But the Program cannot biomonitor
16 something unless it's on the designated chemical list.
17 But being on the designated chemical list doesn't mean
18 that it is biomonitored. So it's necessary, but not
19 sufficient to have a chemical biomonitored. Then you have
20 to design and launch a study that biomonitor for that
21 chemical.

22 Fair? Anything to add?

23 Any other questions or comments?

24 Because if not, we'll end a little early, right?

25 Anything else to get in before the end of the

1 meeting?

2 Okay. Sorry. An early end.

3 In that case, I will just announce that -- well,
4 first of all, I want to thank the staff and all the
5 presenters today who presented an amazing wealth of work.
6 And it's so gratifying to see results coming out. And,
7 you know, it's easy for us to find holes in them, but
8 there's also such a tremendous amount of value that we saw
9 in them, and we also -- I think the Panel really
10 recognizes the constraints that the Program is operating
11 under, and it makes even more impressive every bit of
12 results and findings that come out of the Program.

13 And so I'm always in awe and very appreciative of
14 what you bring to the meetings.

15 With that, I will say that from today, a
16 transcript of this meeting will be posted to the website,
17 the Biomonitoring California website, when it's available.
18 The next SGP meeting is on November 6th. It will be here,
19 same building, same room. And so thank you to
20 Biomonitoring staff, and the Panel, and everyone else who
21 participated, and we'll adjourn the meeting.

22 (Applause.)

23 (Thereupon the California Environmental
24 Contaminant Biomonitoring Program, Scientific
25 Guidance Panel meeting adjourned at 3:50 p.m.)

1 C E R T I F I C A T E O F R E P O R T E R

2 I, JAMES F. PETERS, a Certified Shorthand
3 Reporter of the State of California, do hereby certify:

4 That I am a disinterested person herein; that the
5 foregoing California Environmental Contamination
6 Biomonitoring Program Scientific Guidance Panel meeting
7 was reported in shorthand by me, James F. Peters, a
8 Certified Shorthand Reporter of the State of California,
9 and thereafter transcribed under my direction, by
10 computer-assisted transcription.

11 I further certify that I am not of counsel or
12 attorney for any of the parties to said meeting nor in any
13 way interested in the outcome of said meeting.

14 IN WITNESS WHEREOF, I have hereunto set my hand
15 this 4th day of August, 2019.

16
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