Initial Results from Biomonitoring California Collaborations

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Biomonitoring California
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Purpose of this Agenda Item

• Inform the Panel and public of initial results of Biomonitoring California collaborations

• Obtain input on content and presentation of
  – The materials submitted to the Panel
  – Data Summary Report (July 2012)
Content of “Initial Results” Materials

• Key messages
• Chemicals that Biomonitoring California laboratories can measure
• Descriptions of project collaborations
• Initial combined results from Biomonitoring California collaborations
• Looking forward
Biomonitoring California’s initial studies have identified many chemicals, including flame retardants, pesticides, and plasticizers, in California residents.
Biomonitoring California now has the ability to measure close to 100 chemicals in people and has tested more than 700 Californians.
Biomonitoring California has leveraged limited state resources through successful collaborations.
Chemicals that Biomonitoring California Laboratories Can Measure

• Expanding analytical capabilities to measure chemicals in people
• Figure 1: progress over time
• Table 1: chemicals the labs can measure
Figure 1: Chemicals that Biomonitoring California Laboratories Can Measure - Progress, 2007-2011

- Environmental phenols
- Flame Retardants - PBDEs
- Flame Retardants - Other BFRs & CFRs
- Metals
- PFCs
- Pesticides - Fungicides
- Pesticides - Organochlorines
- Pesticides - Organophosphates
- Pesticides - Pyrethroids
- Phthalates
- PCBs
## Environmental phenols

Environmental phenols have a common chemical structure, so are analyzed as a group. They have a wide variety of uses, described briefly below.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzophenone-3</td>
<td>Benzophenone-3 is a UV blocker used in sunscreens and plastics.</td>
</tr>
<tr>
<td>Bisphenol A (BPA)</td>
<td>BPA is used to make protective coatings, like those inside metal food cans that prevent rust and corrosion. It is also the building block for a hard plastic called polycarbonate.</td>
</tr>
<tr>
<td>4-t-Octylphenol (4-t-OP)</td>
<td>4-t-OP is used in rubber and has been found in recycled tires. 4-t-OP is also used to make ingredients for protective coatings, paints, varnishes, and detergents.</td>
</tr>
<tr>
<td>Parabens</td>
<td>Parabens are widely used as preservatives in cosmetics, lotions, shampoos, deodorants, pharmaceuticals, foods, and beverages.</td>
</tr>
<tr>
<td>Triclosan</td>
<td>Triclosan is used to kill bacteria. It is added to soaps and other consumer products labeled “antibacterial” or “antimicrobial.”</td>
</tr>
<tr>
<td>Phthalates</td>
<td>Phthalates are added to vinyl to make it soft and flexible. Vinyl products include shower curtains, flooring, and plastic tubing. Phthalates are also in some nail polish and scented products.</td>
</tr>
<tr>
<td>Polychlorinated biphenyls (PCBs)</td>
<td>PCBs were banned in the late 1970s but last a long time in the environment. They are found in high-fat fish and high-fat animal and dairy products. PCBs are also found in old caulk and old fluorescent light fixtures.</td>
</tr>
</tbody>
</table>

### Analyzed in urine:
- Benzophenone-3
- BPA
- 4-t-OP
- 4 parabens
- Triclosan

### Analyzed in serum:
- BPA
- Triclosan

### Excerpt of Table 1
Biomonitoring California Collaborations

• Include studies of more than 10 populations

• Essential collaborations:
  – University of California
  – Orange County Fire Authority
  – Kaiser Permanente

• CDC five-year Cooperative Agreement provides critical support for Program advancement
1. **Full Project Collaborations:** Biomonitoring California designed and carried out the entire study in partnership with other organizations. This includes choosing the population; recruiting participants in the study; collecting survey information and blood and urine samples; and conducting laboratory analyses.

2. **Laboratory Collaborations:** Biomonitoring California conducted laboratory chemical analyses on blood and urine samples collected by outside partners as part of other research projects.
Example of Narrative Description

Full Project Collaboration

The **Firefighter Occupational Exposures (FOX) Project** is a study of environmental chemical exposures in firefighters conducted in partnership with the University of California (UC) Irvine’s Center for Occupational and Environmental Health and the Orange County Fire Authority. Questionnaire information and blood and urine samples were collected in 2010-2011 from 101 male and female firefighters in Orange County, California. Firefighters were chosen because they are likely to be exposed to toxic chemicals as a result of their profession.
Laboratory Collaboration

The Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS), a study conducted by researchers at UC Berkeley, is following a cohort of children in the agricultural communities of the Salinas Valley. Their mothers were enlisted while pregnant, and the children have been followed through age 12 to learn more about the potential impact of chemical and other environmental exposures on children’s health. Biomonitoring California laboratories analyzed phthalates in urine samples from a subset of participants.
## Biomonitoring California Full Project and Laboratory Collaborations*

<table>
<thead>
<tr>
<th>Study Name</th>
<th>Number of Participants</th>
<th>Population</th>
<th>Catchment Area</th>
<th>Chemicals Being Biomonitored</th>
<th>Dates Samples Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Project Collaboration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firefighter Occupational Exposures (FOX) Project</td>
<td>101</td>
<td>Firefighters</td>
<td>Orange County</td>
<td>X X X X X X X X X X</td>
<td>2010-2011</td>
</tr>
<tr>
<td><strong>Laboratory Collaboration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) Study</td>
<td>49</td>
<td>5-year-old children</td>
<td>Salinas Valley</td>
<td>X</td>
<td>2005-2006</td>
</tr>
</tbody>
</table>

*Excerpt of Table 2*
Initial Combined Results from Biomonitoring California Collaborations

• Combined preliminary results from diverse individual studies
  – Additional analyses underway
• Shows chemicals the Program has measured so far in California residents
• Includes detection frequency
  – The percentage of people in whom the chemicals were found
<table>
<thead>
<tr>
<th>Chemical</th>
<th>Study+</th>
<th>Number of People</th>
<th>Detection Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>A,B,D</td>
<td>529</td>
<td>61%</td>
</tr>
<tr>
<td>Lead</td>
<td>A,B,D</td>
<td>529</td>
<td>100%</td>
</tr>
<tr>
<td>Manganese</td>
<td>A,B</td>
<td>452</td>
<td>100%</td>
</tr>
<tr>
<td>Mercury</td>
<td>A,B,D</td>
<td>529</td>
<td>97%</td>
</tr>
<tr>
<td>Perfluorochemicals (PFCs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>49%</td>
</tr>
<tr>
<td>2-(N-Methyl-perfluorooctane sulfonamido) acetic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>99%</td>
</tr>
<tr>
<td>Perfluorobutane sulfonic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>4%</td>
</tr>
<tr>
<td>Perfluorodecanoic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>72%</td>
</tr>
<tr>
<td>Perfluorododecanoic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>1%</td>
</tr>
<tr>
<td>Perfluoroheptanoic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>58%</td>
</tr>
<tr>
<td>Perfluorohexane sulfonic acid</td>
<td>B,E,F</td>
<td>137</td>
<td>100%</td>
</tr>
<tr>
<td>Perfluorononanoic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>100%</td>
</tr>
<tr>
<td>Perfluorooctane sulfonamide</td>
<td>B,D,F</td>
<td>203</td>
<td>83%</td>
</tr>
<tr>
<td>Perfluorooctane sulfonic acid (PFOS)</td>
<td>B,D,E,F</td>
<td>236</td>
<td>100%</td>
</tr>
<tr>
<td>Perfluorooctanoic acid (PFOA)</td>
<td>B,D,E,F</td>
<td>236</td>
<td>86%</td>
</tr>
<tr>
<td>Perfluoroundecanoic acid</td>
<td>B,D,F</td>
<td>203</td>
<td>97%</td>
</tr>
</tbody>
</table>

*Excerpt of Table 3
Looking Forward

• Detailed findings on individual studies will be released in the near future
• Expanding laboratory capability, capacity
• Building capacity to produce data representative of the state’s general population
  – Study in Central Valley with adult participants approximately representing regional population
• Findings will inform state programs
CLARIFYING QUESTIONS AND GENERAL COMMENTS
DISCUSSION QUESTIONS FOR UPCOMING DATA SUMMARY REPORT
With regard to the three main messages contained in the materials for the SGP:

• Are these messages useful and appropriate?
• Are there other messages that should be included?
With regard to the “Chemicals that Biomonitoring California Laboratories Can Measure”*:  

• Are these groupings of chemicals useful and understandable?  
• Should additional information suitable for a technical audience be included – for example, information on method detection limit (MDL)?  
• Is there other chemical-specific information that would be helpful to include?  
• Any suggested changes to Figure 1?

*Table 1 and Figure 1
With regard to “Biomonitoring California Project Collaborations”*

• Is this level of detail adequate for the Data Summary Report?
• Is there any other information that should be included?

*Description of Biomonitoring California Project Collaborations and Table 2
With regard to the “Initial Combined Results from Biomonitoring California Project Collaborations:”*

- Is the information in Table 3 useful and clear?
- Is the detection frequency useful to report for the initial combined results?
- Would any other information be useful to include in Table 3?

*Table 3