



# Uses of Biomonitoring California data: risk assessment focus

Biomonitoring California, Scientific Guidance Panel

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# Uses of Biomonitoring California's products

- Research
- Lab method references
- Results return
- Exposure information
- Programmatic model
- Exposure reduction efforts (community and individual)
- Risk assessment and management
- Legal and other regulatory uses

# Possible uses for risk assessment/management

- Demonstrate exposure is occurring
- Understand time trends
  - Relative to regulations/laws
- Compare to existing population guidance levels
- Estimate external doses for risk assessment calculations

# Possible uses for risk assessment/management

- Demonstrate exposure is occurring → Bulk of the usage
- Understand time trends
  - Relative to regulations/laws
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- Estimate external doses for risk assessment calculations

# Possible uses for risk assessment/management

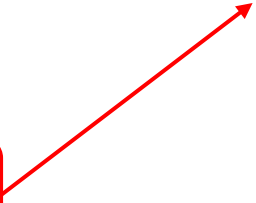
- Demonstrate exposure is occurring
- Understand time trends
  - Relative to regulations/laws

- CA attorney general's lawsuit against PFAS manufacturers
- CA flammability standard change, comments to UK regulators

- Compare to existing population guidance levels, if exist
- Estimate external doses for risk assessment calculations

# Possible uses for risk assessment/management

- Demonstrate exposure is occurring
- Understand time trends
  - Relative to regulations/laws
- Compare to existing population guidance levels
- Estimate external doses for risk assessment calculations



Programmatic  
use of PFAS  
NASEM levels

# Possible uses for risk assessment/management

- Demonstrate exposure is occurring
- Understand time trends
  - Relative to regulations/laws
- Compare to existing population guidance levels
- Estimate external doses for risk assessment calculations
  - For comparing to source calculations (validate)
  - For comparing to proposed source limits, such as drinking water concentrations
  - For estimating expected average exposure scenario and extreme scenarios
  - For estimating other differences within a population (such as for age or sex)

NHANES  
CHMS

# Demonstrate exposure is occurring

- For regulatory prioritization processes and published assessments
- Types of evidence needed
  - Exposure/No exposure is occurring
  - Exposure is common (e.g., high detection frequencies)
    - In California and similar to US
  - Exposure is changing over time (increase/decrease)
  - Exposure is different in vulnerable/specialty groups
  - Exposure is different in California than other places

Main current  
uses by CA  
entities



# Examples of Biomonitoring California data use in risk assessments

- California drinking water advisory levels
- Proposition 65
  - Requires California to publish a list of chemicals known to cause cancer, birth defects or other reproductive harm

# California Drinking Water Advisory Levels

- Public Health Goals (PHGs)
  - Level of a chemical contaminant in drinking water that does not pose a significant risk to health over a lifetime
  - Scientific basis for California's Maximum Contaminant Levels (MCLs), set by the State Water Resources Control Board
- Notification Levels (NLs)
  - Health-based advisory levels for chemicals without MCLs, set by the State Water Resources Control Board

# Use of Biomonitoring CA data: Drinking Water Advisory Levels

- Help prioritize development of PHGs and NLs when a chemical:
  - Is consistently found in biomonitoring studies and in sampled water
  - Has a high detection frequency
  - Can be compared to NHANES or other data sources

**Examples: PFAS: PFOA, PFOS, PFHxS, PFHxA, PFBS, and PFHpA**

- Provide exposure context in official PHG and NL recommendation documents to the CA Water Boards

**Examples: PFAS: PFOA, PFOS, PFHxS, and PFHxA**



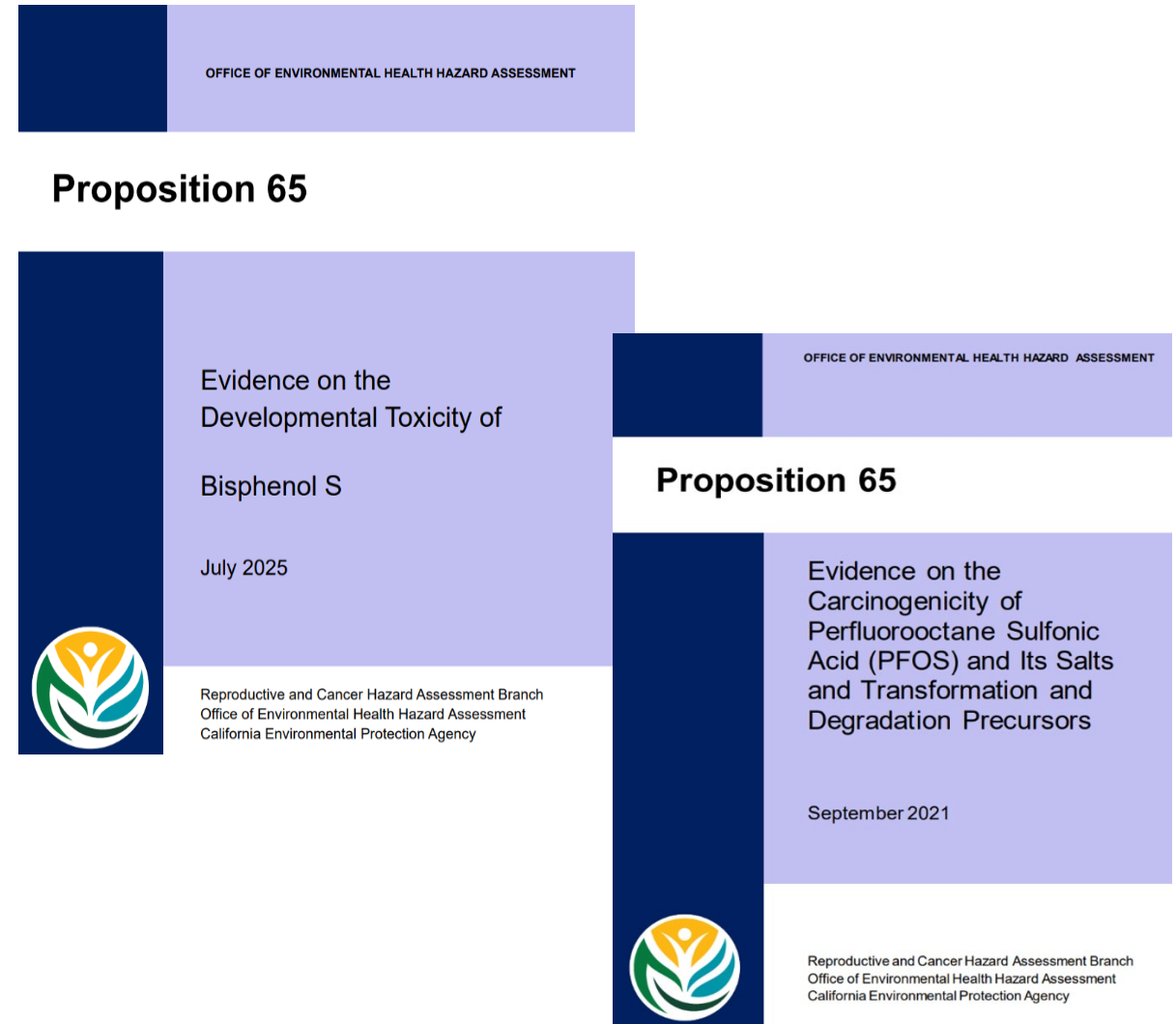
# Use of Biomonitoring CA data: Proposition 65 listing

- Help prioritize for possible listing consideration
  - Potential for exposure in CA is needed
  - Detection frequency less important

**Examples: Benzophenone-3, bisphenol A (BPA), diethyl phthalate (DEP), PFASs**

- Provide exposure context in Hazard Identification Documents (HIDs) for listing consideration by the State's Qualified Experts

**Examples: BPA, bisphenol-S (BPS), PFOS**



# Use of Biomonitoring CA data: regulatory examples

- Biomonitoring CA lists of designated and priority chemicals
  - CA Safer Consumer Products: Background document on quaternary ammonium compounds
  - CA Air Resources Board: AB2588's Emission Inventory Criteria, a list of substances for assessing toxic air pollutants
- Exposure is common
  - Prioritization process for CA Safer Consumer Products priority product listing - submission: QACs, parabens

# Use of Biomonitoring CA data: evaluating exposures among vulnerable subpopulations

- Firefighters
  - 2021 ATSDR Tox Profiles: PFAS
  - 2023, 2025 IARC Monographs: Occupational Exposure as a Firefighter, PFOS/PFOA
  - 2025 Response to public comment - EPA Draft Risk Evaluations for Phthalates
  - 2025 Health Canada State of Per- and Polyfluoroalkyl Substances (PFAS) Report
- High fish-eating populations
  - 2024 Supreme Court interested party filing - Mercury and Air Toxics Standards (MATS)
- Life stage specificity (pregnancy period)
  - 2022 State of Washington Per- and Polyfluoroalkyl Substances Chemical Action Plan

# Use of Biomonitoring CA data: example additional opportunities<sup>†</sup>

|               | Sample Collection  | Approx. N*     | Metals | PFASs    | Phenols | PAHs | VOCs | PBDEs | OPFRs |
|---------------|--------------------|----------------|--------|----------|---------|------|------|-------|-------|
| MIEEP         | 2010-11            | 92             | X      | X        | X       | X    |      | X     |       |
| FOX           | 2010-11            | 101            | X      | X        | X       | X    |      | X     | X     |
| Pilot BEST    | 2011-12            | 112            | X      | X        | X       | X    |      | X     |       |
| E-BEST        | 2013               | 341            | X      | X        | X       | X    |      | X     |       |
| MAMAS         | 2012-2016          | 1300           |        | X        |         |      |      | X     |       |
| ACE 1, 2      | 2016-2017          | 200            | X      | X        |         |      |      |       |       |
| ACE 2         | 2017               | 100            | X      | X        |         |      |      |       |       |
| FREES         | 2016-17            | 28             |        |          |         |      |      | X     | X     |
| CARE-LA, 2, 3 | 2018-2020          | 879            | X      | X        | X       |      |      |       |       |
| EBDEP         | 2018-19            | 40 pairs       |        |          |         | X    | X    |       |       |
| SAPEP         | 2021               | 18             |        |          |         | X    | X    |       |       |
| BiomSPHERE    | 2023               | 64 pairs       |        |          |         | X    | X    |       |       |
| FRESSCA       | 2023               | 51             | X      |          |         | X    | X    |       |       |
| STEPS         | 2015, 2018, 2021 + | 500 per county |        | upcoming |         |      |      |       |       |

<sup>†</sup>Other chemicals included in some studies: pesticides, phthalates, perchlorate, diesel exhaust metabolites

\*For some studies, smaller N subsets were used for some panels.

# Next steps

- Formalize and continue supplementing our documentation of data uses, promote on website
- Provide insights for programmatic strategic planning. Could impact:
  - Types of studies
  - Chemical selection
  - Lab method goals
    - breadth vs. depth, high/low LODs, speed
  - Publication format
    - Website tables, reports, peer-reviewed short communications, longer peer-reviewed publications
- Investigate reasons behind uses
  - Deeper discussions with potential data users for risk assessment
    - Explore further opportunities to disseminate data
  - Learn from other biomonitoring programs such as Canadian Health Measures Survey



# Study acronyms

|            |                                                                                                     |
|------------|-----------------------------------------------------------------------------------------------------|
| MIEEP      | Maternal and Infant Environmental Exposure Project                                                  |
| FOX        | Firefighter Occupational Exposures Project                                                          |
| CTS        | California Teachers Study                                                                           |
| Pilot BEST | Biomonitoring Exposures Study – 1.Pilot                                                             |
| E-BEST     | Biomonitoring Exposures Study – 2.Expanded                                                          |
| MAMAS      | Measuring Analytes in Maternal Archived Samples                                                     |
| ACE 1      | Asian/Pacific Islander Community Exposures Project 1                                                |
| ACE 2      | Asian/Pacific Islander Community Exposures Project 1                                                |
| CARE-LA    | California Regional Exposure Study, Los Angeles County                                              |
| CARE-2     | California Regional Exposure Study, Region 2                                                        |
| CARE-3     | California Regional Exposure Study, Region 3                                                        |
| EBDEP      | East Bay Diesel Exposure Project                                                                    |
| SAPEP      | Stockton Air Pollution Exposure Project                                                             |
| BiomSPHERE | Biomonitoring component of the San Joaquin Valley Pollution and Health Environmental Research Study |
| FRESSCA    | Filtration for Respiratory Exposure to Wildfire Smoke from Swamp Cooler Air                         |
| STEPS      | Studying Trends in Exposure in Prenatal Samples                                                     |

## Other acronyms

|        |                                                           |
|--------|-----------------------------------------------------------|
| NASEM  | National Academies of Sciences, Engineering, and Medicine |
| CHMS   | Canadian Health Measures Survey                           |
| PHGs   | Public Health Goals (OEHHA)                               |
| NLs    | Notification Levels (OEHHA)                               |
| IARC   | International Agency for Research on Cancer               |
| ATSDR  | Agency for Toxic Substances and Disease Registry          |
| APHL   | Associated Public Health Laboratories                     |
| CARB   | California Air Resources Board                            |
| DERBI  | Digital Exposure Report-Back Interface                    |
| NHANES | National Health and Nutrition Examination Survey          |

# Thank you

- Questions?
- Please provide your usages through SGP, website, or email:  
[biomonitoring@oehha.ca.gov](mailto:biomonitoring@oehha.ca.gov)
- Special thanks to assistance from Elizabeth Marder and intern Lily Borak

