



DTSC LABORATORY UPDATE

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Environmental Chemistry Laboratory

Scientific Guidance Panel
March 3, 2016
Sacramento, CA

Outline

- Staffing
- Progress with CA Teachers Study
- Plans for upcoming studies
- Other DTSC activities that benefit the Biomonitoring Program

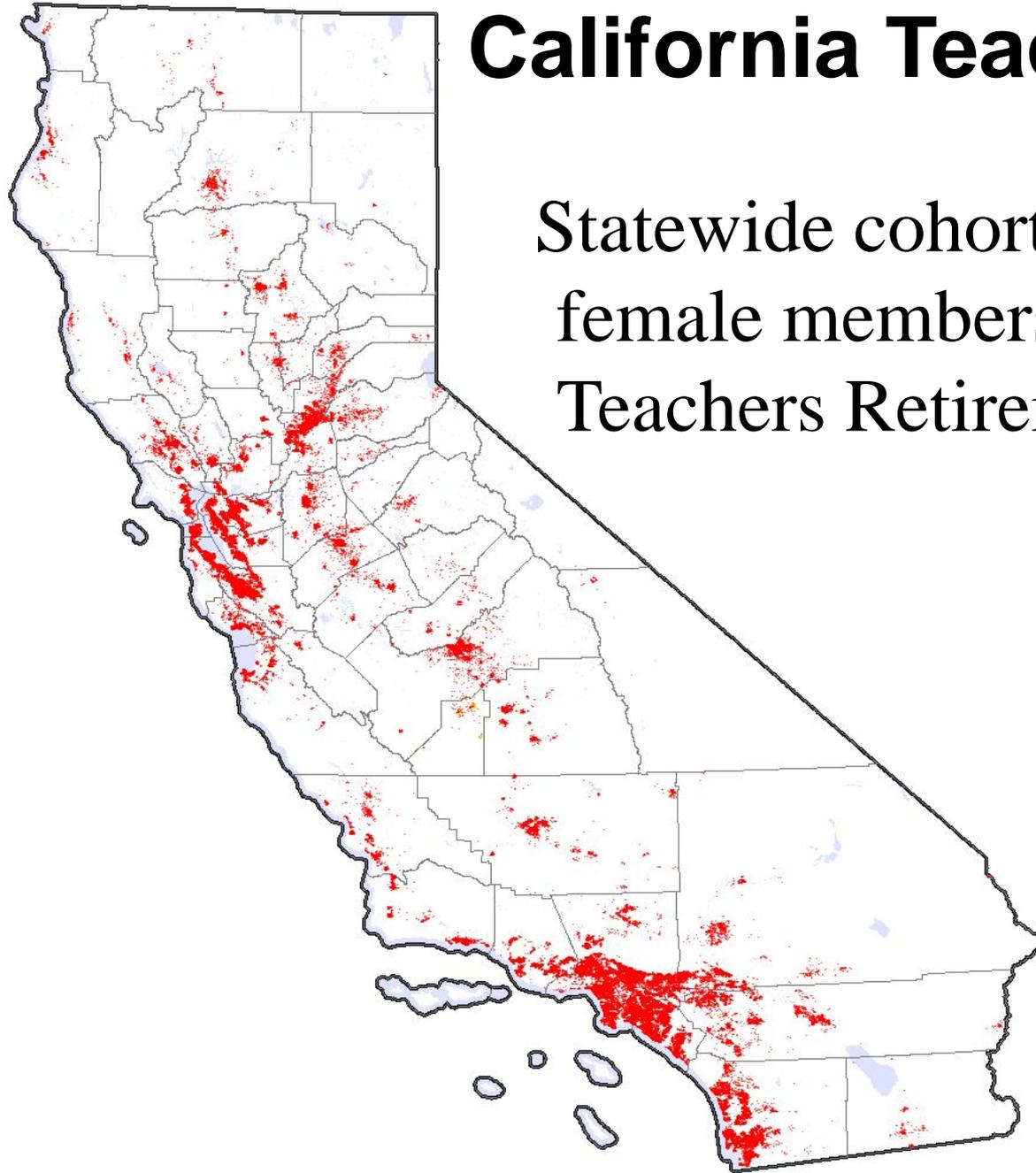
Staffing

- Biomonitoring Branch formed with 2015-17 budget
- Dr. June-Soo Park, Branch Chief
- Consolidating State & CDC-funded staff
- Dr. Erika Houtz left the Program

- Difficulties filling vacancies

California Teachers Study

Statewide cohort of (133,479)
female members of the State
Teachers Retirement System



CA Teachers Study (CTS): Overview

- Annual re-contact since inception (1995)
- Periodic questionnaires (every 2 – 3 years)
- Annual outcome follow-up via linkage to Cancer Registry, hospitalization, mortality databases
- Initially supported with California Prop-99 funds; subsequently with Federal and State research grants

CTS and Persistent Organics (POPs)

- Sub-study funded by CA Breast Cancer Research Program
- In collaboration with:
 - Cancer Prevention Institute of California, UCI, City of Hope
- Blood samples from ~1,000 cases and ~1,000 controls from entire State
- Recruitment and sample collection: 2011-2015
- Analysis of OCPs, PCBs, PBDEs, PFCs, thyroid hormones, lipids

CTS and POPs: Specific Aims

1. Screen for major predictors of PBDEs

- Behavioral factors
- Sociodemographic disparities
- Indoor and outdoor variables

2. Assess POPs as risk factors for breast cancer

Dr. Peggy Reynolds, PI, to give presentation at future SGP

Progress with the CA Teachers Study (CTS) (as of Feb 29, 2016)

	n=3,244 received		
	PFCs	PBDEs	PCBs/OCPs
Extraction completed	2,031	2,198	2,198
Instrument analysis completed	2,031	2,183	2,183
Data review completed	2,031	1,527	793
Data released to PI, to be posted on website	1,605	1,527	793

First Look at CTS Data

Estrogenic activity

In collaboration with City of Hope colleagues:

- Used chemical analyses to validate a novel bioassay (AroER tri-screen)
 - Estimated overall estrogenic activities in serum as a potential intermediate risk factor for breast cancer
- Kanaya N, et al. (2015). AroER tri-screenTM is a novel functional assay to estimate both estrogenic and estrogen precursor activity of chemicals or biological specimens. *Breast Cancer Research and Treatment*, 151(2): 335-345

First Look at CTS Data

New CA Breast Cancer Research Program award

Menopausal transition--a window of susceptibility for the promotion of breast cancer by environmental exposures
(Dr. Shiuan Chen, PI)

- Additional serum samples to be analyzed for:
PBDEs (250) and PFCs (600)

First Look at CTS Data

Residential Proximity to Solid Waste Facilities

Liu et al. Association between Serum PBDE Levels and Residential Proximity to Solid Waste Facilities. *ES&T*, In Press

- 932 participants without breast cancer
- Solid Waste Information System of CA Department of Resources Recycling and Recovery
- 1570 facilities utilized to receive, store, separate, convert, transfer or otherwise process solid wastes

First Look at CTS Data

Residential Proximity to Solid Waste Facilities (*cont.*)

Compared to participants living >10 km from a facility:

- Those living within 2 km had 45% higher BDE-47 and BDE-100 levels
- Those living between 2-10 km had 35% higher BDE-47 and 29% higher BDE-100

ECL Seminar, March 23, 2016, 2-3 PM ([Register](#))

Measuring Analytes in Maternal Archived Samples (MAMAS)

Biobank serum samples from pregnant women

- Completed analyses from 1st round (Orange/San Diego Counties; pregnancies in 2012)
- Received 2nd round (Alameda/Contra Costa, Los Angeles, Riverside/San Bernardino, and 19 Northern Counties; pregnancies in 2015)
- PBDEs, PCBs and OCPs in serum (N=160)
- Expanded PFASs (n=35) in serum (N=350)

Foam Replacement Environmental Exposure Study (FREES)

Do exposures change if sources are removed?

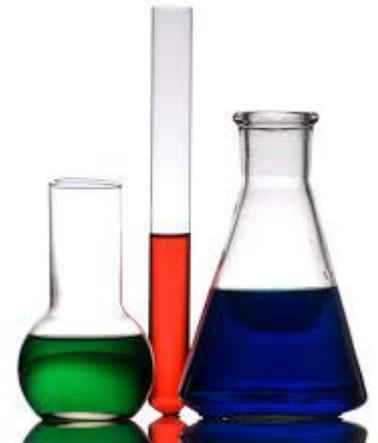
- In collaboration with UC Davis, Environmental Working Group, Green Science Policy Institute, and Silent Spring Institute
- Recruiting ~25 participants willing to replace furniture
- Attempting to recruit about 10 affordable housing participants (subsidizing furniture replacement)
- Questionnaires, sampling at baseline, 6, 12, 18 months

Ready for FREES samples

- PBDEs in serum
- OPFR metabolites in urine
- PBDEs, other BFRs, OPFRs in foam and hand wipes
- Dust to be analyzed by UCD
- ECL Seminar, March 9, 2016, 2-3 PM ([Register](#))



Other DTSC activities that benefit Biomonitoring California



PBDEs in Breast Milk

We had reported very high PBDEs in CA breast milk (n=82) collected in 2003-05 (Park et al. 2011, *ES&T*)

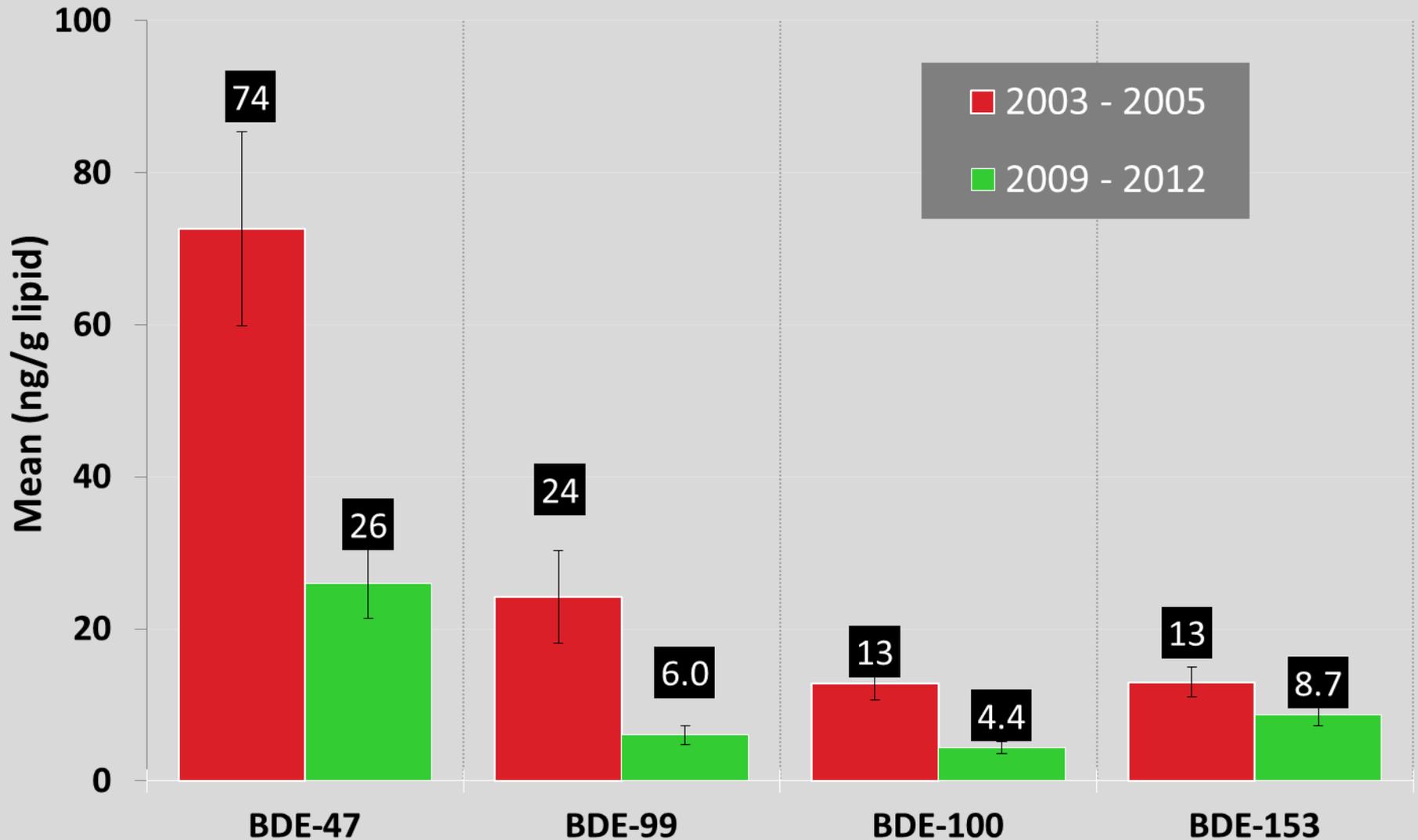
We repeated the study in 2010-11 (n=67)

- Similar demographics and protocols
- Also collected cord blood and maternal blood

Partially funded by USEPA Region IX

PBDEs in breast milk are decreasing in California

(Guo et al. Chemosphere, 2015)



PBDEs in breast milk (*cont.*)

- ❑ ~39% drop in GM \sum_{10} PBDEs between two time periods
- ❑ 30% of babies still exposed to BDE47 above the USEPA RfD (100 ng/kg-d)
- ❑ 60% exceeded the RfD in the earlier study

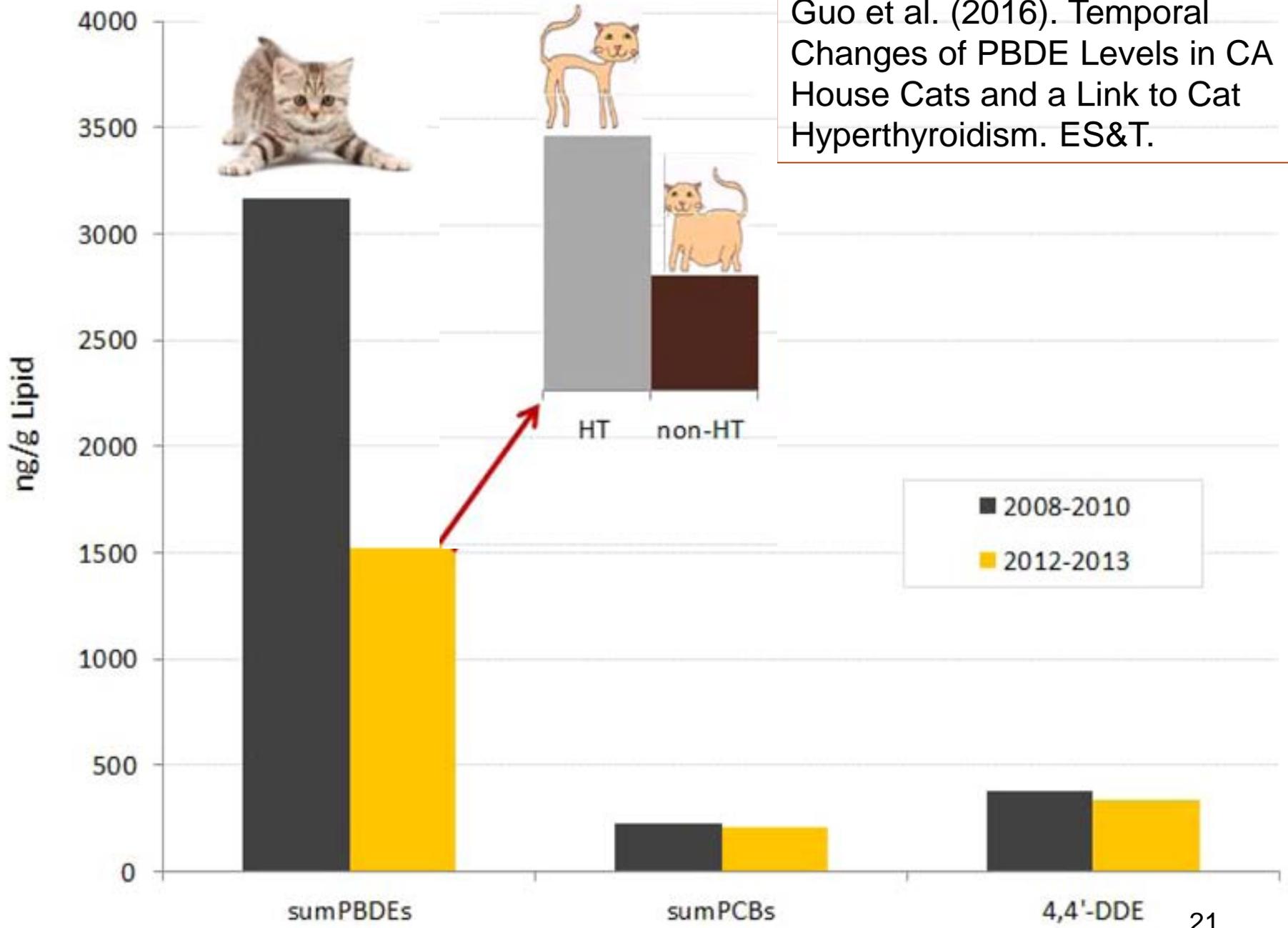
PBDEs dropping in breast milk

At Press Event (Feb 24, 2016), DTSC Director Barbara Lee stated:

*“This study shows that regulatory and public health intervention works. The new findings **underscore the importance of biomonitoring studies**, and highlight the concrete benefits of product reformulation.”*

<http://www.sacbee.com/news/local/article62345647.html>

Guo et al. (2016). Temporal Changes of PBDE Levels in CA House Cats and a Link to Cat Hyperthyroidism. ES&T.

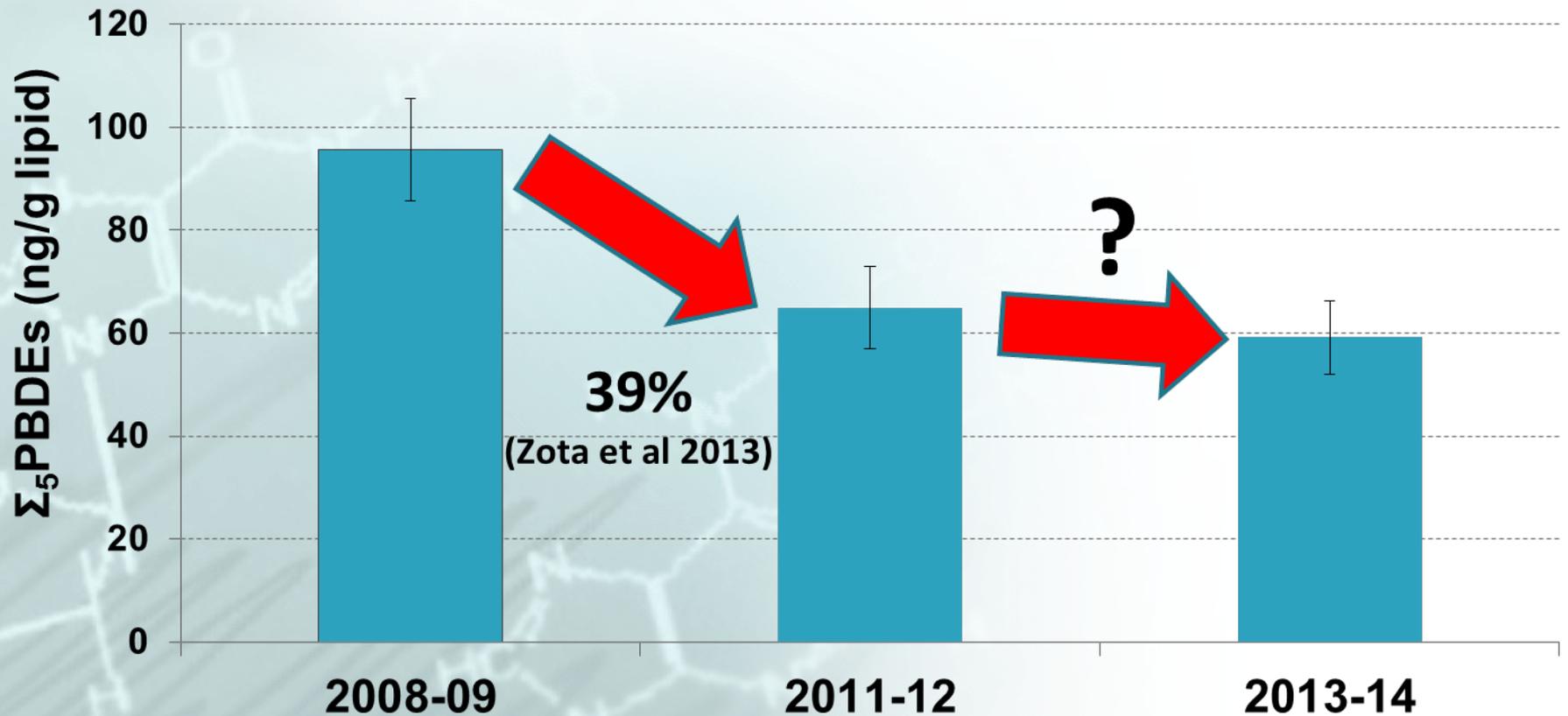


PBDEs dropping in CA

- Consistent with phase-out of PBDEs from furniture.
 - No PBDEs are present in newer furniture analyzed in support of SB1019 (labeling law)
- Consistent with our previous findings in human blood (Zota et al. 2013. *ES&T*)
- Will they continue dropping or reach a plateau (as PCBs did)?

Temporal Changes: $\Sigma 5$ PBDEs

(San Francisco General Hospital Maternal Serum: 2nd Trimester)



Questions?

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