BIOMONITORING CALIFORNIA

Program Update

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California Department of Public Health

Biomonitoring California
Scientific Guidance Panel Meeting
July 26, 2012 – Oakland, CA

Program Updates

1. **Staffing and Funding**
2. **Projects**

   Maternal and Infant Environmental Exposures (MIEEP)

   Firefighter Occupational Exposures (FOX)

   Biomonitoring Exposures Study (BEST)
3. **Collaborations** with other researchers
4. **Additional Activities**

Staff Changes

Thank you and farewell to Dr. Rupali Das,

Biomonitoring California Lead, 2009-2012

- Program Lead – search ongoing to replace Dr. Das
- New Staff Programmer Analyst – John Chen
- New Research Scientist I (in-kind) – Lauren Joe

Funding

- State of California
  - maintained for 2012-2013 at same level as prior years
- CDC Cooperative Agreement
  - Year 4 of 5
  - Awaiting continuation notification

Maternal and Infant Environmental Exposure Project (MIEEP)

Chemicals in Our Bodies Project

MIEEP

- Collaboration with UCSF and UC Berkeley
- Convenience sample from SFGH
- 92 mothers enrolled; 65 mother-infant pairs
- Current status:
  - Imminent release of 1st set of chemical results
  - Sample analyses ongoing
  - Preparation of results return materials for 2nd set of chemicals

MIEEP Analyses

Analyte	Status
Metals in blood (cadmium, lead, mercury)	Complete
Perfluorinated compounds (PFCs)	Complete
Polybrominated diphenyl ethers (PBDEs)	Complete
Polychlorinated biphenyls (PCBs)	Complete
Organochlorine pesticides (OCPs)	Complete
Creatinine	**Complete**
Bisphenol A (BPA), triclosan and benzophenone-3	**Complete**
Pyrethroid and Organophosphate (OP) metabolites	**Complete**
Phthalates	**Complete**
Hydroxy polycyclic aromatic hydrocarbons (OH-PAHs)	Under review
Dialkyl phosphate metabolites (DAPs)	Under review
Metals in urine	Method being validated

Current MIEEP Status

Recruitment	Collection	Data	Results
✓ Recruit, enroll, and consent participants	✓ Collect maternal urine	✓ Analyze 1st set of chemicals	✓ Translate materials into Spanish
✓ Preliminary interview	✓ Interview participants	Analyze 2nd set of chemicals	Return 1st set of results
✓ Distribute exposure questionnaires	✓ Collect take-home questionnaire	✓ Abstract medical records	Return 2nd set of results
	✓ Collect maternal blood	✓ Enter questionnaires & medical records	Analyze participant understanding
	✓ Collect umbilical cord blood	Analyze data	

Firefighter Occupational Exposures (FOX)

FOX Project

- Collaboration with UC Irvine and Orange County Fire Authority (OCFA)
- Convenience sample of 101 OCFA Firefighters
- 1st set of chemical results returned
- Current status:
  - Ongoing data analyses
    - Fire station dust samples and station house characteristics
    - Biomonitoring data and exposure assessment factors
  - Ongoing laboratory chemical analyses

FOX Analyses

Analyte	Status
Metals in blood (cadmium, lead, mercury, manganese)	Complete
Perfluorinated compounds (PFCs)	Complete
Polybrominated diphenyl ethers (PBDEs)	**Complete***
Polychlorinated biphenyls (PCBs)	**Complete***
Organochlorine pesticides (OCPs)	**Complete***
Creatinine	Under review
Phthalates	Under review
Hydroxy polycyclic aromatic hydrocarbons (OH-PAHs)	Under review
Bisphenol A (BPA), triclosan and benzophenone-3	Under review
Pyrethroid and Organophosphate (OP) metabolites	Under review
Dialkyl phosphate metabolites (DAPs)	In progress
Metals in urine	Method being validated

* 2 samples need to be reanalyzed

Current FOX Status

Recruitment	Collection	Data	Results
✓ Recruit participants	✓ Collect blood and urine	✓ Data entry	✓ Return 1st set of results
✓ Enroll participants at wellness exam	✓ Collect exposure assessment questionnaire	✓ Analyze 1st set of chemicals	Return 2nd set of results
	✓ Abstract information from medical record	Analyze 2nd set of chemicals	Evaluation survey
	✓ Collect environmental samples	Evaluate and review data	
	✓ Collect information on firehouses	Analyze & review environmental sample data	

FOX Preliminary Results:

Participants (n=101)

Characteristics
Gender: >90% male
Age: mean = 43 years
Race/ethnicity: most are white, non-Hispanic
Time worked as a firefighter: 1.5 - 40 yrs
Job Title: ~50% firefighters ~50% engineers, captains, or chiefs

FOX Preliminary Results:

Blood Metals

Metal (units)	MDL	DF (%)	Range	% FOX results ≥ NHANES 95th Percentile
Cadmium (µg/L)	0.15	78	0.2 – 0.8	0
Lead (µg/dL)	0.02	100	0.3 – 5.9	1%
Mercury (µg/L)	0.06	100	0.1 – 13.4	15%
Manganese (µg/L)	0.54	100	4.3 – 15.8	N/A

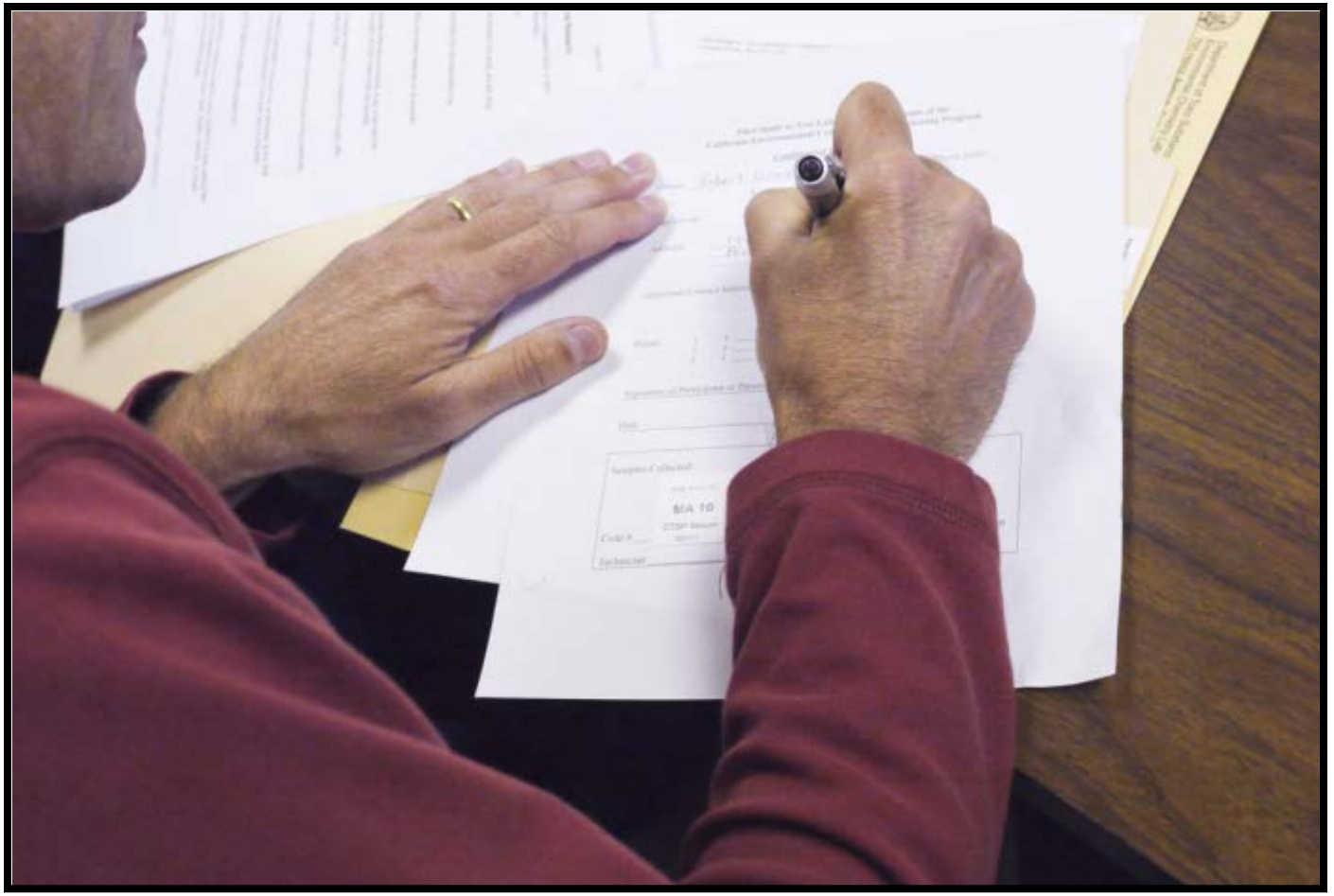
MDL method detection limit
DF detection frequency
NHANES National Health & Nutrition Examination Survey (2009-2010 adult males)
NA not applicable (NHANES did not measure manganese)

FOX Preliminary Results:
Selected Perfluorinated Chemicals

PFC	MDL (µg/L)	DF (%)	Range (µg/L)	% FOX results ≥ NHANES 95th Percentile
PFOS	0.083	100	0.93 – 46.6	1%
PFOA	0.301	100	0.30 - 18.1	6%

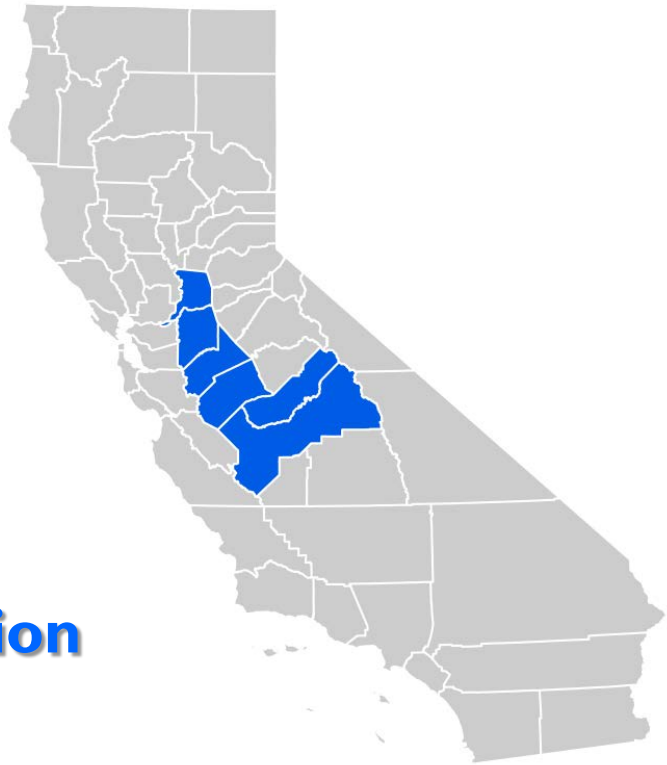
MDL method detection limit
DF detection frequency
NHANES National Health & Nutrition Examination Survey (2009-2010 adult males)

Biomonitoring Exposures Study (BEST)



Pilot BEST

- Collaboration with Kaiser Permanente Northern California, Division of Research
- Stratified random sample of adult KPNC members from California's Central Valley
- Current status:
  - **Recruitment and sample collection completed for 112 participants**



Current Pilot BEST Status

Recruitment	Collection	Data	Results
✓ Recruit participants from random sample	✓ Collect blood and urine	✓ Enter data	Usability testing – English
✓ Schedule home visits	✓ Collect exposure assessment questionnaires	✓ Analyze samples for blood metals	Return 1st set of results
✓ Consent & enroll participants at visit	Abstract information from medical records	Analyze urine and serum samples	Return 2nd set of results
		Analyze data	Evaluation survey

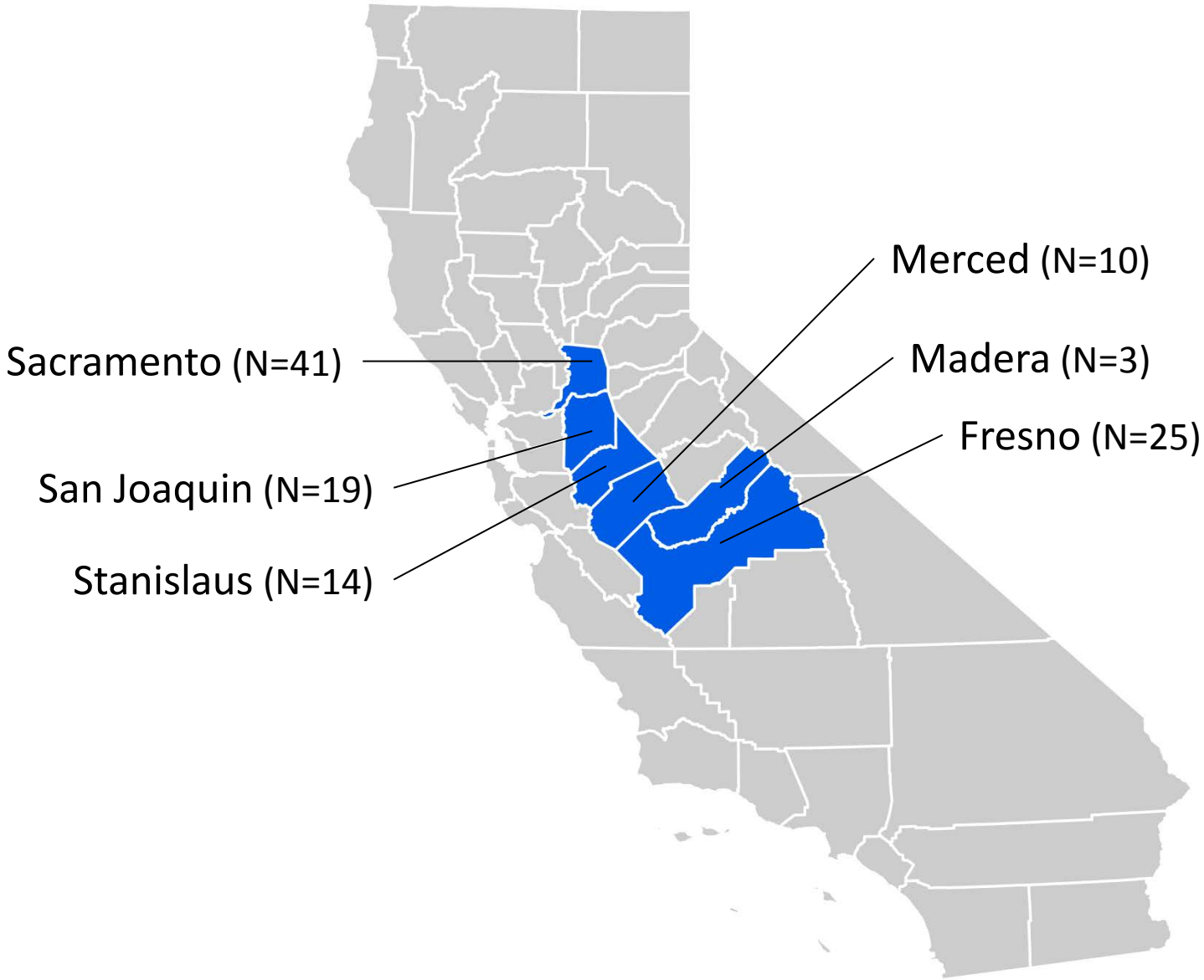
Pilot BEST Recruitment Process

County-by-county recruitment of KP members initiated with letters and return postcards

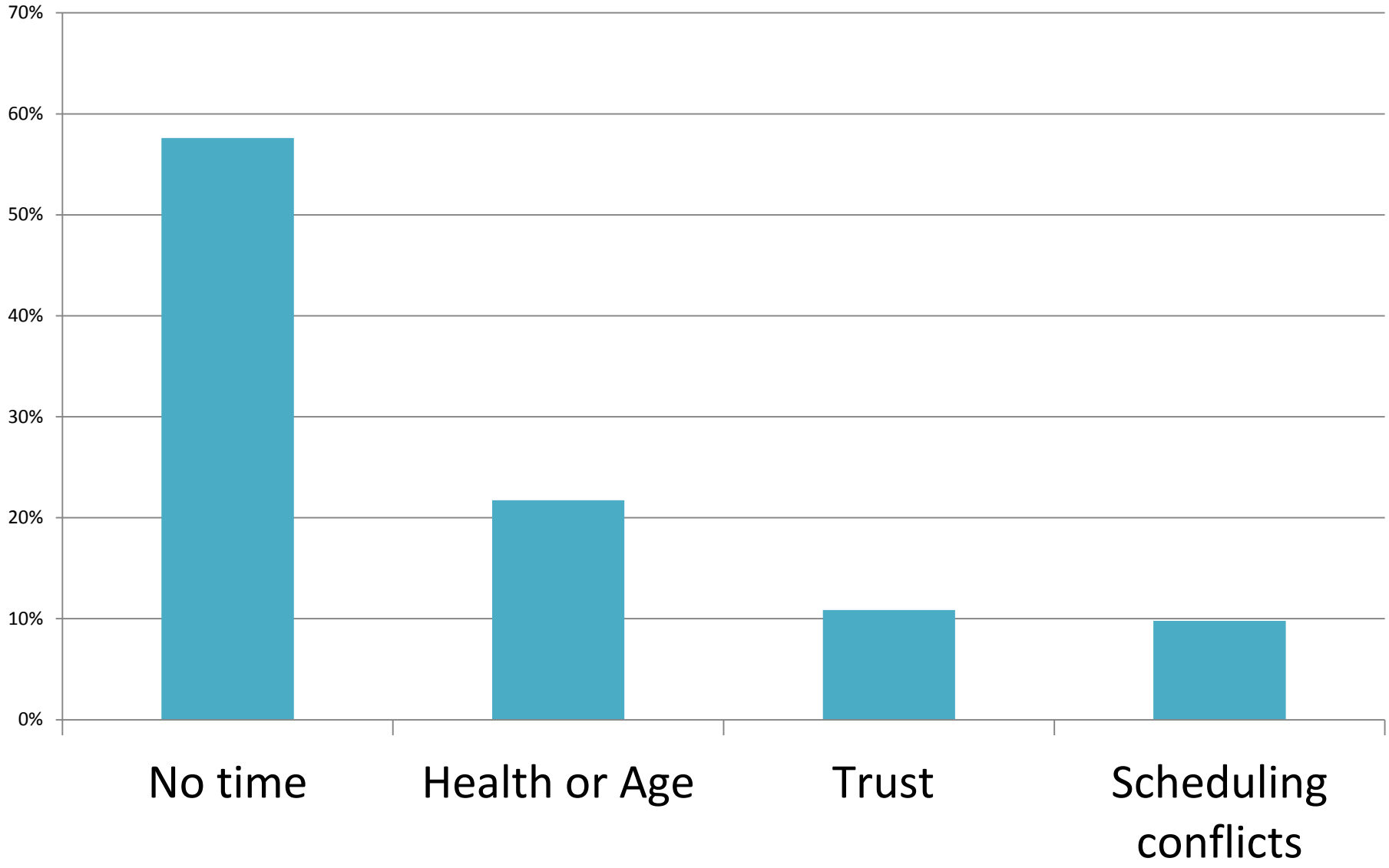
Recruitment calls made

After county goal was met,
began recruitment in next county.

Pilot BEST Participation by County



Reasons Given for not Participating in BEST



Usability Testing of Results Return Materials for Pilot BEST

- Goal: Test understanding of materials among a broader audience than in MIEEP or FOX
- Approach: review of mock results in several rounds, initially among English-speaking participants and then among Spanish speakers

2 Rounds of Usability Testing (English) Completed for Pilot BEST

- Selected Findings
  - Misunderstanding that chemicals stay in the body permanently
  - Difficulty interpreting graphs and the term "median"
- Next Steps
  - Address issues identified in English testing
  - Translate documents and conduct testing with Spanish speakers

Expanded BEST

- Goal: enroll ~200 additional participants
- Design changes from pilot BEST:
  - English- and Spanish-speaking
  - All materials in both languages
  - Online and hard-copy questionnaires
  - KPNC laboratory ordering system

Collaborations with other researchers

Collaborations with other researchers: Request for Information (RFI)

- Issued December 2011
- Criteria for selection included:
  - Study group from California
  - Sensitive population
  - Specimens collected in 2005 or later
  - Adequate sample volumes, collection & storage protocols
- 8 applications received

RFI – Selected Collaborations

Environmental pollutants in childhood leukemia –

- Study population - Mothers of children with/without leukemia
- Chemicals - PBDEs, PCBs, OCPs
- Research questions

  1. Are levels of these chemicals in mothers' sera correlated with:
     - their children's serum chemical levels?
     - home dust chemical levels?

  2. Do levels of chemicals in mothers of children with leukemia differ from those in mothers of healthy children?

- Dr. Catherine Metayer, U.C. Berkeley

RFI – Selected Collaborations

CHAMACOS –

- Study Population - Salinas Valley children
- Chemical – bisphenol A (BPA) and related phenols
- Research Question

  What is the variation in BPA over time within and between 3-6 year-old children?

- Dr. Asa Bradman, U.C. Berkeley

RFI – Selected Collaborations

Urinary PAH variability in relation to ovarian function –

- Study Population – Women in Orange County
- Chemicals - 8 PAH metabolites
- Research Questions

  1. What is the variation in urinary PAH metabolite concentrations over several menstrual cycles?
  2. Are changes in urinary PAH biomarker concentrations associated with changes in markers of ovarian function?

- Dr. Ulrike Luderer, U.C. Irvine

Additional Program Activities

- **Survey** of environmental health priorities - California Local Health Officers and Directors of Environmental Health
  - Responses received from 38 counties & 2 cities encompassing 85% of CA population
- **Data summary report** – under review
- **Video** – soon to be launched online

Thank you for your contributions!

Josephine Alvaran	Laura Fenster	Nancy Lopez	Jed Waldman
Frank Barley	Jeff Fowles	Amiko Mayeno	Dongli Wang
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Rupali Das	Simon Ip	Jianwen She	Lauren Zeise
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Amy Dunn	Farla Kaufman	Darcy Tarrant	Wei Zou
Ruifang Fan	Gail Krowech	Alanna Viegas	