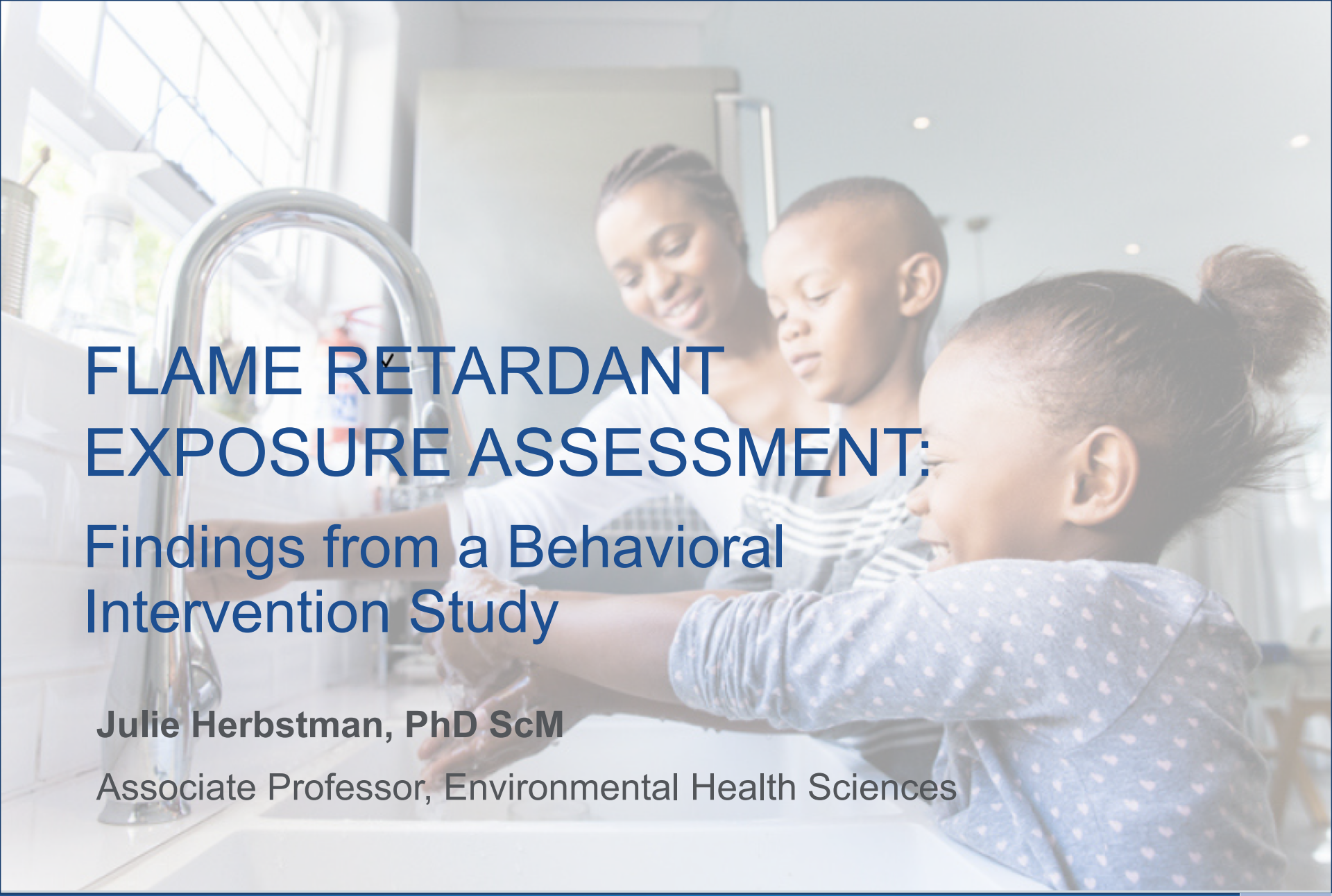

FLAME RETARDANT EXPOSURE ASSESSMENT:

Findings from a Behavioral Intervention Study

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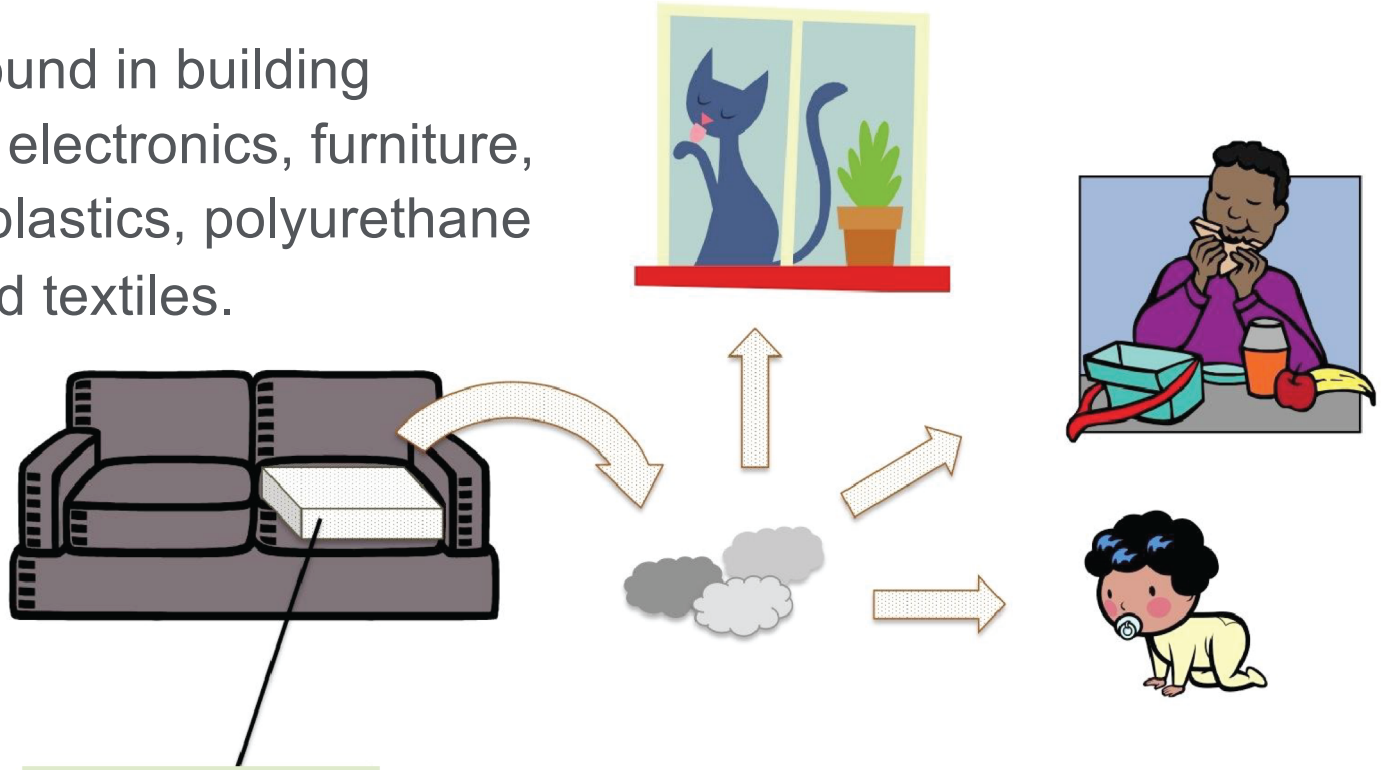
Background: Flame Retardants

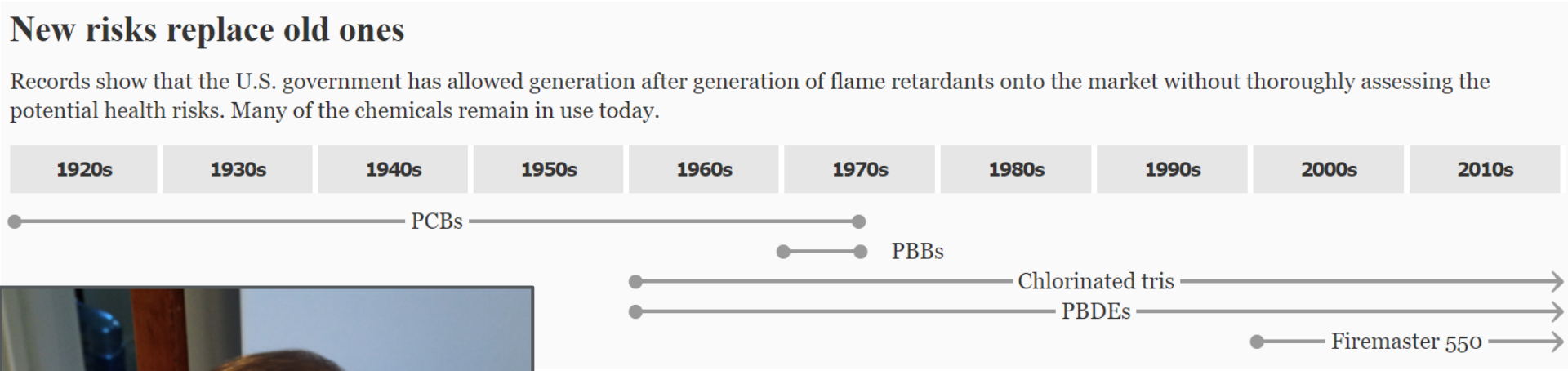
Chemicals found in building materials, electronics, furniture, vehicles, plastics, polyurethane foams, and textiles.



1. Flame retardants are not bound to foam.
2. They off-gas from foam and settle into dust
3. Dust is ingested through hand-to-mouth contact

http://greensciencepolicy.org/topics/flame-retardants/http://greensciencepolicy.org/topics/flame-retardants/

Exposure in Children is a Major Concern



- Exposure constellation has changed over time.
- Children typically have more exposure than adults.
- Children are likely more sensitive to the effects of exposure
  - Developmental neurotoxicity

What does EPA say?

- Wash your hands and your children's hands often, especially before eating.
- Dust frequently with a moist cloth.
- Wet mop or vacuum with a HEPA filter attachment often.
- Prevent small children from chewing on products that may contain these chemicals.
- Repair tears to upholstered furniture.
- Wipe and vacuum the interior of your car often as seats and dashboards contain flame retardant chemicals

https://www.epa.gov/sites/production/files/2016-05/documents/flame_retardant_fact_sheet_3-22-16.pdf

http://media.graytvinc.com/images/Does+It+Work.JPG

Study Design

Study Population:

- Cohort: Sibling-Hermanos Study in Northern Manhattan/South Bronx

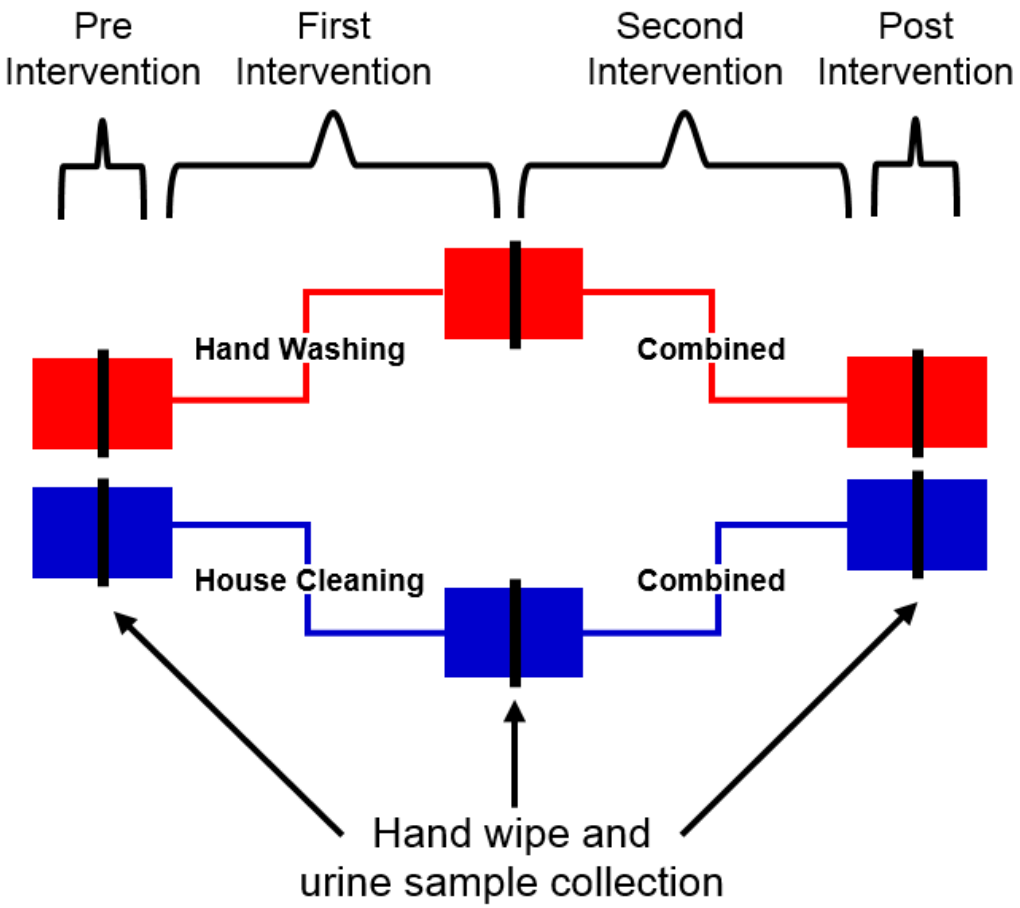
Study Sample:

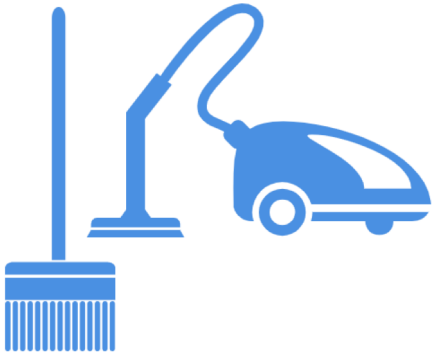
- 32 mothers and their 3-6 year old children
  - 16 African American
  - 16 Dominican

Timeframe:

- 2 weeks between December 2015 and May 2016

Study Design

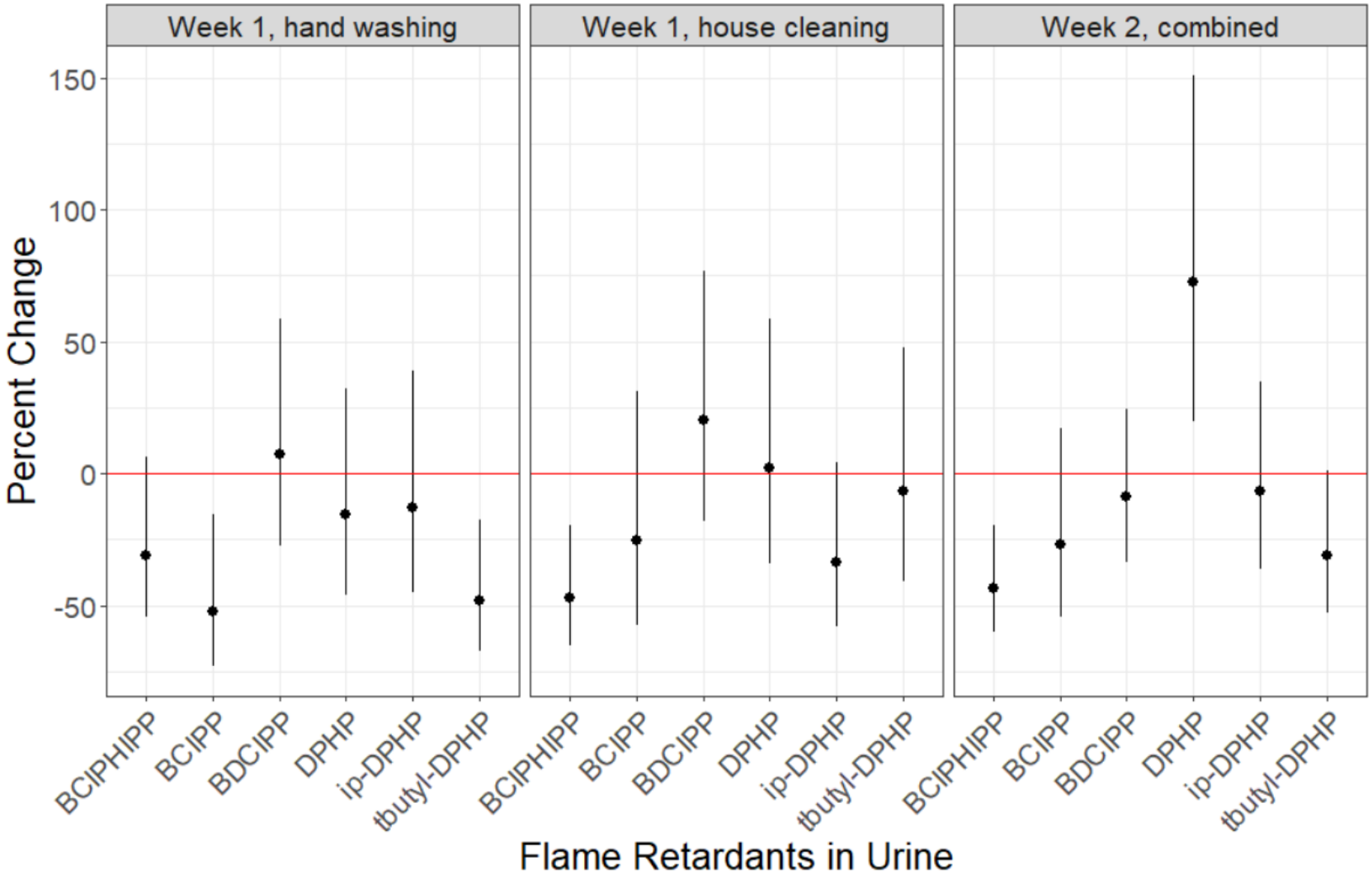




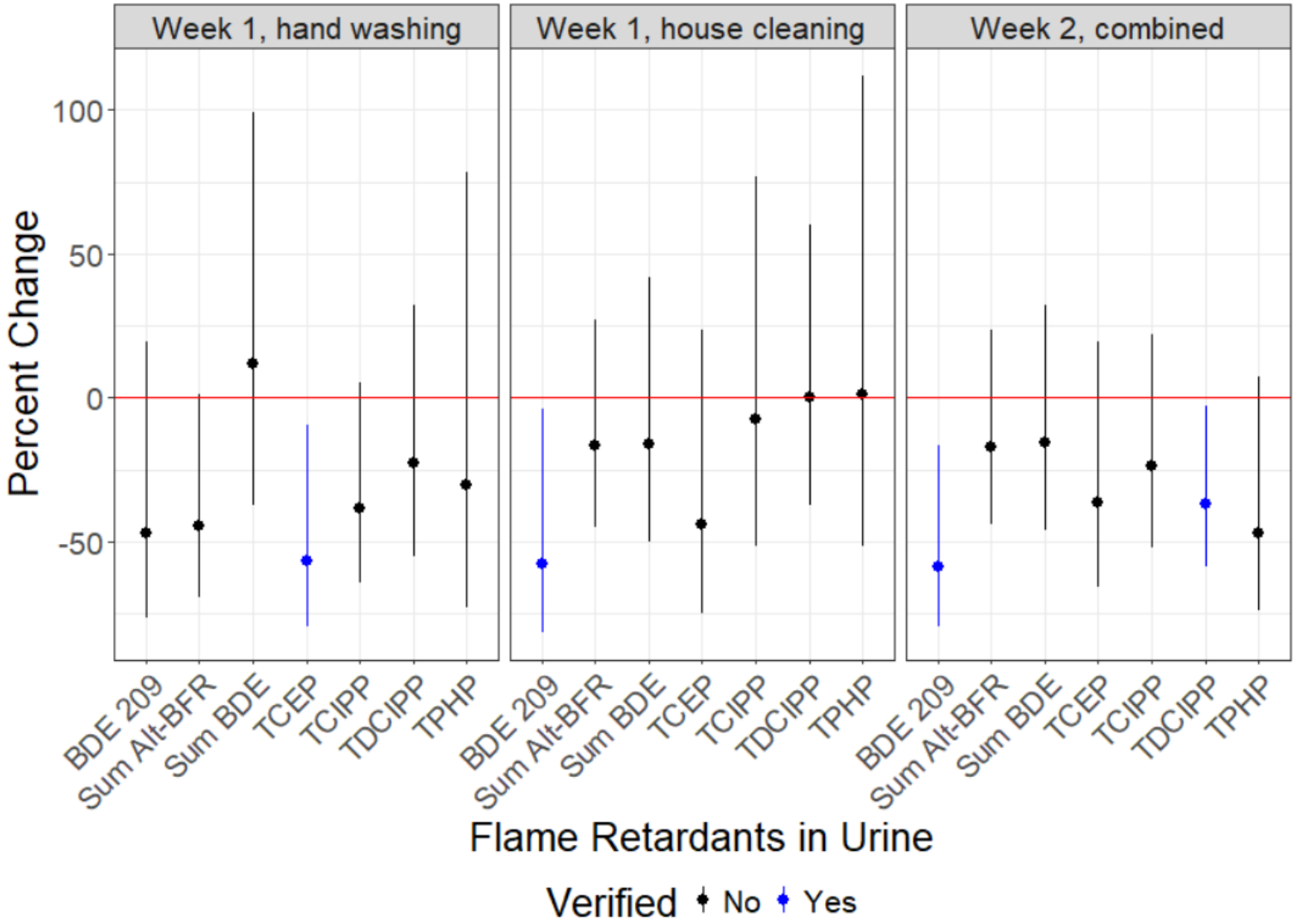
Measurements: only in mothers

Parent compound on hand wipe	Urinary metabolite
TDCIPP	BDCIPP
TPHP	DPHP
TCIPP	BCIPP
	BCIPHIPP
TCEP	Not measured
Not measured	ip-DPHP
Not measured	tbutyl-DPHP
PBDEs	Not measured
Alt-BFRs	Not measured

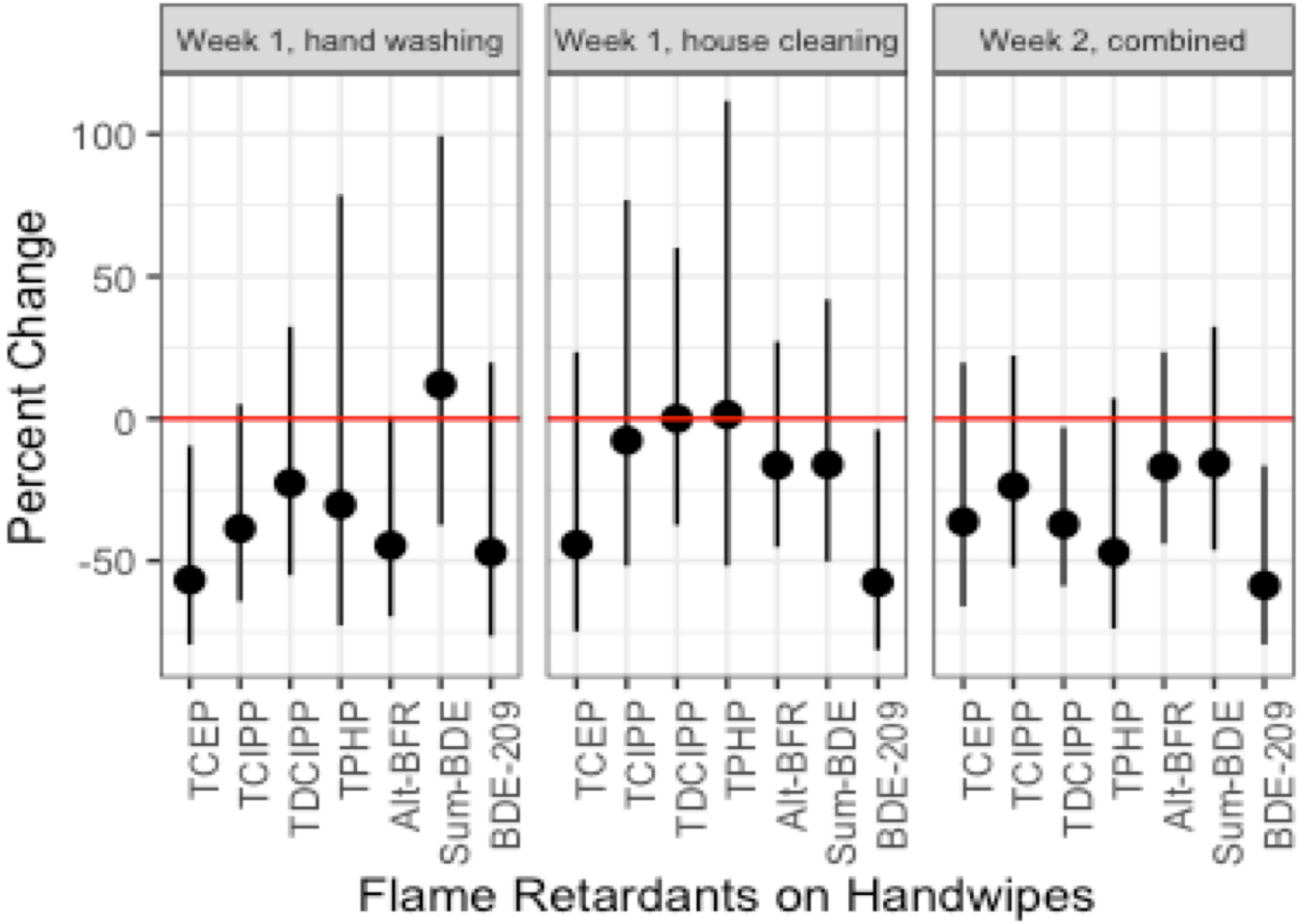
Results: All women



Results: Baseline exposure above the median



Results: Baseline exposure above the median



Conclusions

- 100% of participants had detectable levels of PBDEs, OPFRs, and Alt-BFRs at baseline.
- Both house cleaning and handwashing reduced exposure by up to 50%.
- This was most evident among individuals with ”high” (above the median) exposure at baseline.
- No intervention reduced exposure below the limit of detection.
- Behavioral change can reduce but not eliminate flame retardant exposure.

Additional Thoughts/Caveats

- Only tested in mothers; does it also work in children?
- Evaluated only a 2 week period: are these behaviors sustainable?
- Hand washing is a habit that can be practiced anywhere; but house cleaning is only effective for exposure in homes.
- Given that exposure was reduced but not eliminated, this behavioral intervention is not a substitute for policy.

References

Full text (Open Access):

Gibson EA, Stapleton HM, Calero L, Holmes D, Burke K, Martinez R, Cortes B, Nematollahi A, Evans D, Herbstman JB. Flame retardant exposure assessment: findings from a behavioral intervention study. J Expo Sci Environ Epidemiol. 2019 Jan;29(1):33-48. doi: 10.1038/s41370-018-0049-6. Epub 2018 Jun 28. https://www.ncbi.nlm.nih.gov/pubmed/29950671

Additional report comparing exposure in mothers and children:

Gibson EA, Stapleton HM, Calero L, Holmes D, Burke K, Martinez R, Cortes B, Nematollahi A, Evans D, Anderson KA, Herbstman JB. Differential exposure to organophosphate flame retardants in mother-child pairs. Chemosphere. 2019 Mar;219:567-573. doi: 10.1016/j.chemosphere.2018.12.008. Epub 2018 Dec 4. https://www.ncbi.nlm.nih.gov/pubmed/?term=30553217

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