

Chemical Exposures from the Built Environment – Developmental Risks & Environmental Justice

Tracey Woodruff, PhD, MPH

University of California, San Francisco

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Nothing to Declare



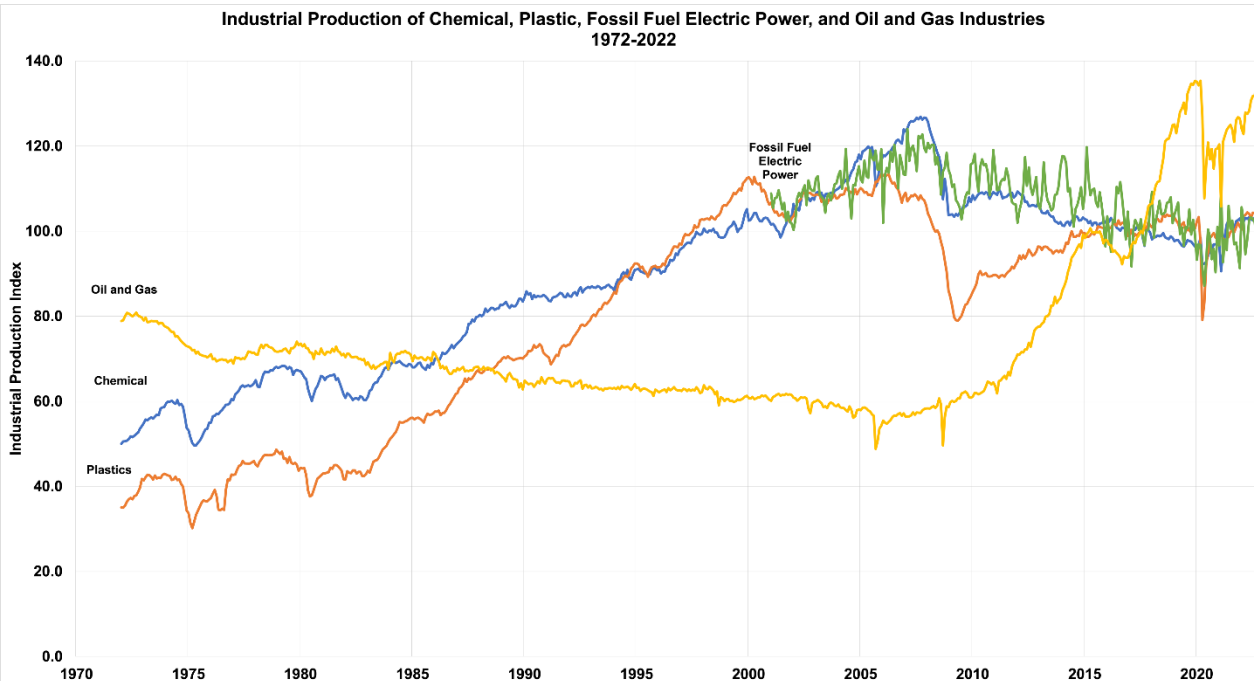
UCSF Program on Reproductive Health
and the Environment



Our system to regulate toxic chemicals is not working and puts people and communities in harms way



Increasing Chemical/Fossil Fuel Production



1970-202



Oil and Gas
68% increase



Chemical
106% increase

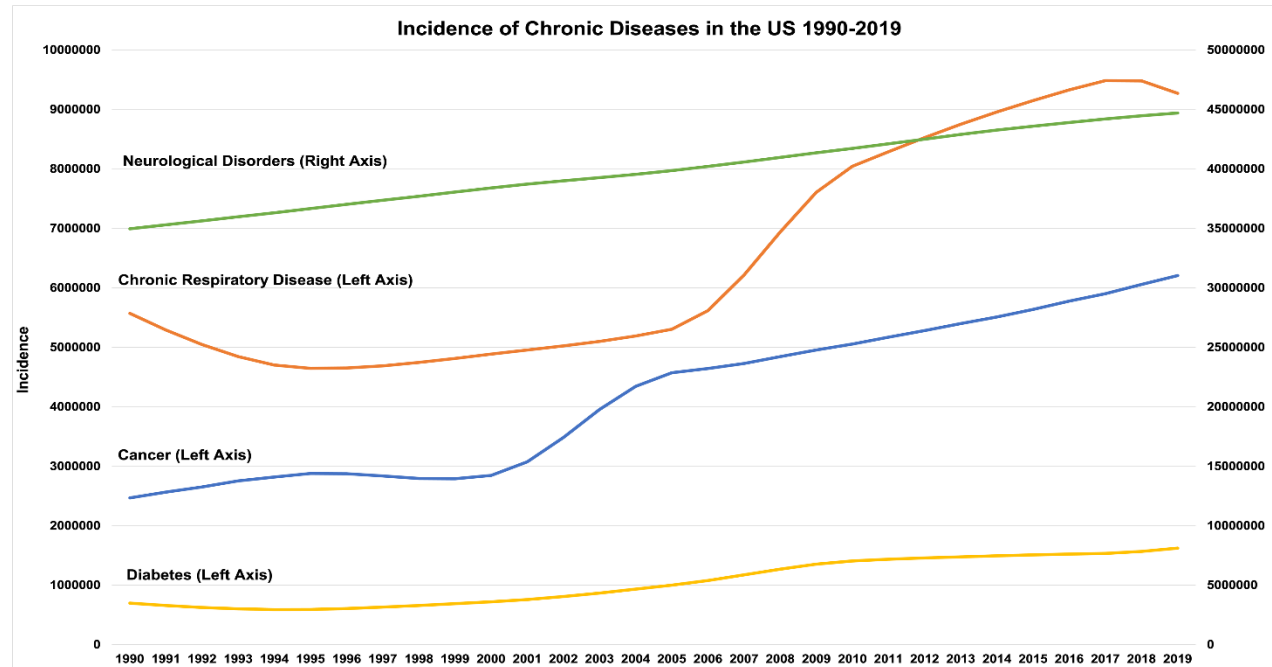


Fossil Fuel Electric Power
9% decrease



Plastics
192% increase

Increasing Chronic Disease



1990-2019



Cancer
151% increase



Diabetes
132% increase



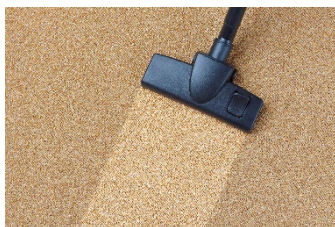
Chronic Respiratory Disease
66% increase



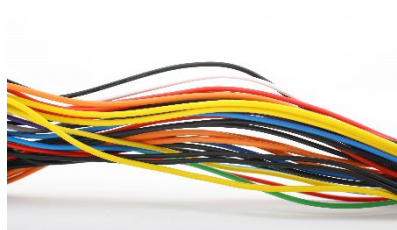
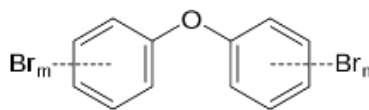
Neurological Disorders
28% increase



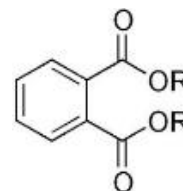
~30,000 lbs of industrial chemicals produced for each person in the U.S. each year



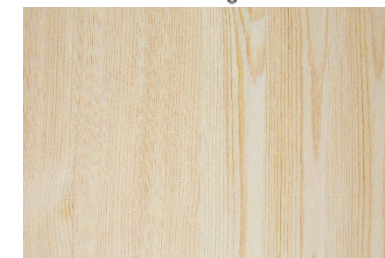
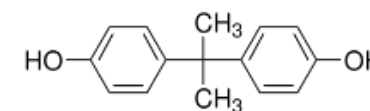
PFAS



Flame Retardants



Phthalates



Phenols

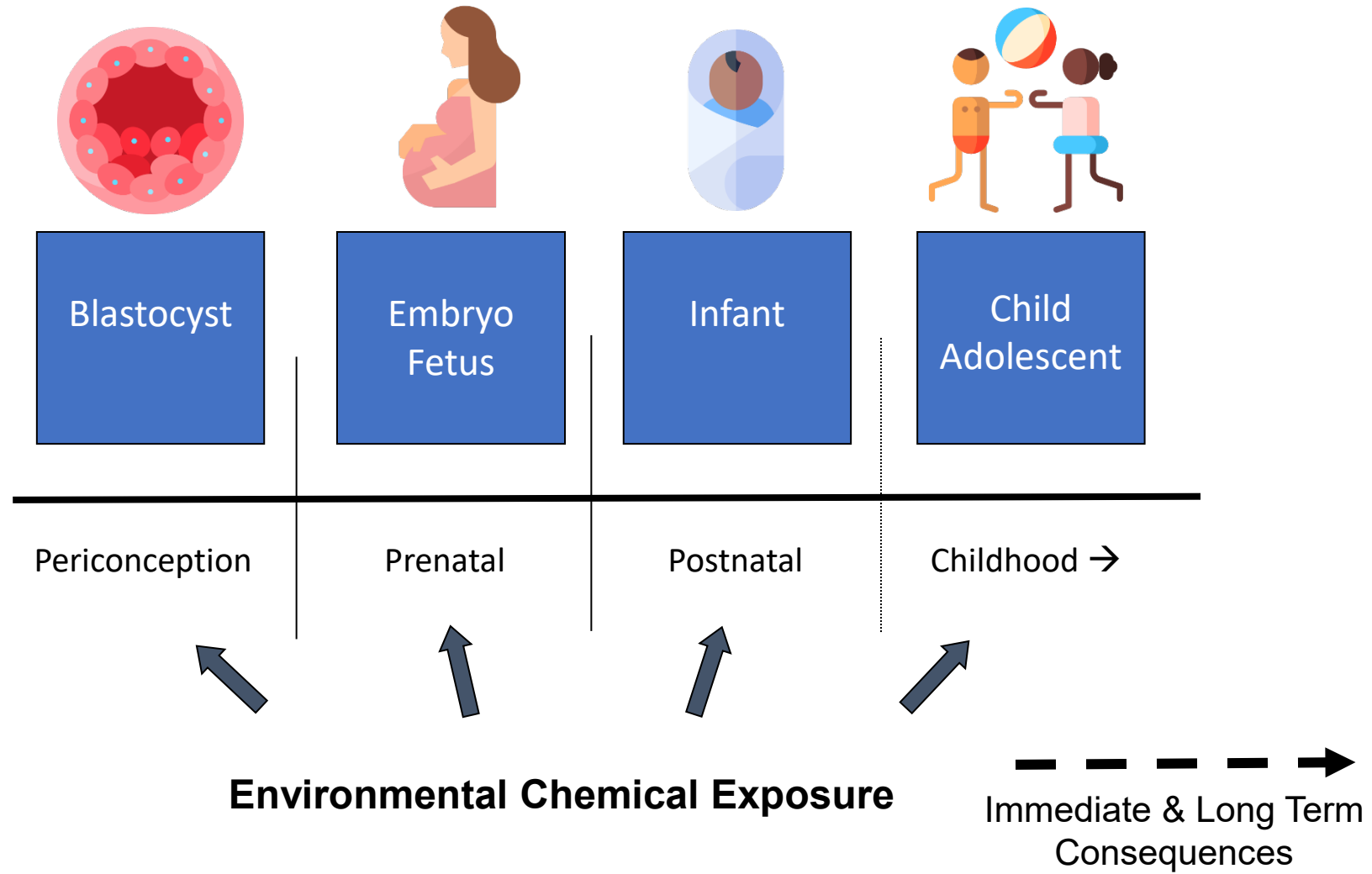
People are unnecessarily exposed to harmful chemicals



We urgently need a change.



Critical and Sensitive Windows of Development



And also maternal health

- Physiological changes during pregnancy can increase risk of -

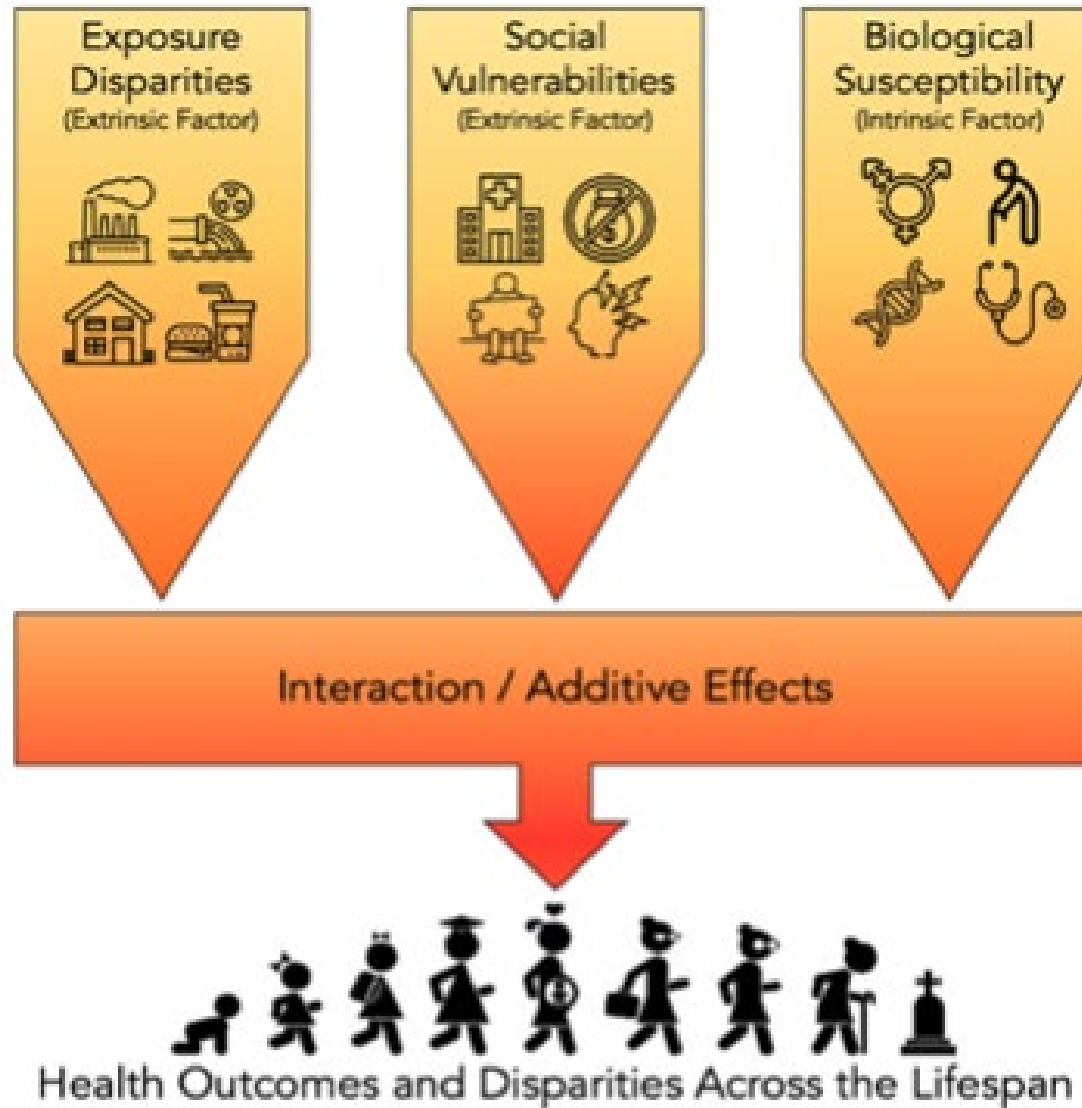
Breast Cancer
As you prepare for lactation, mammary glands differentiate into milk-producing buds.

Pregnancy also dramatically increases production of hormones, the signaling molecules that coordinate major physiological changes.

Gestational Diabetes
As the metabolism shifts to preserve glucose for the growing fetus, maternal blood sugar and insulin resistance increase.

Preeclampsia
The placenta remodels blood vessels, redirecting blood flow toward the "maternal-fetal interface" to support the growing fetus.

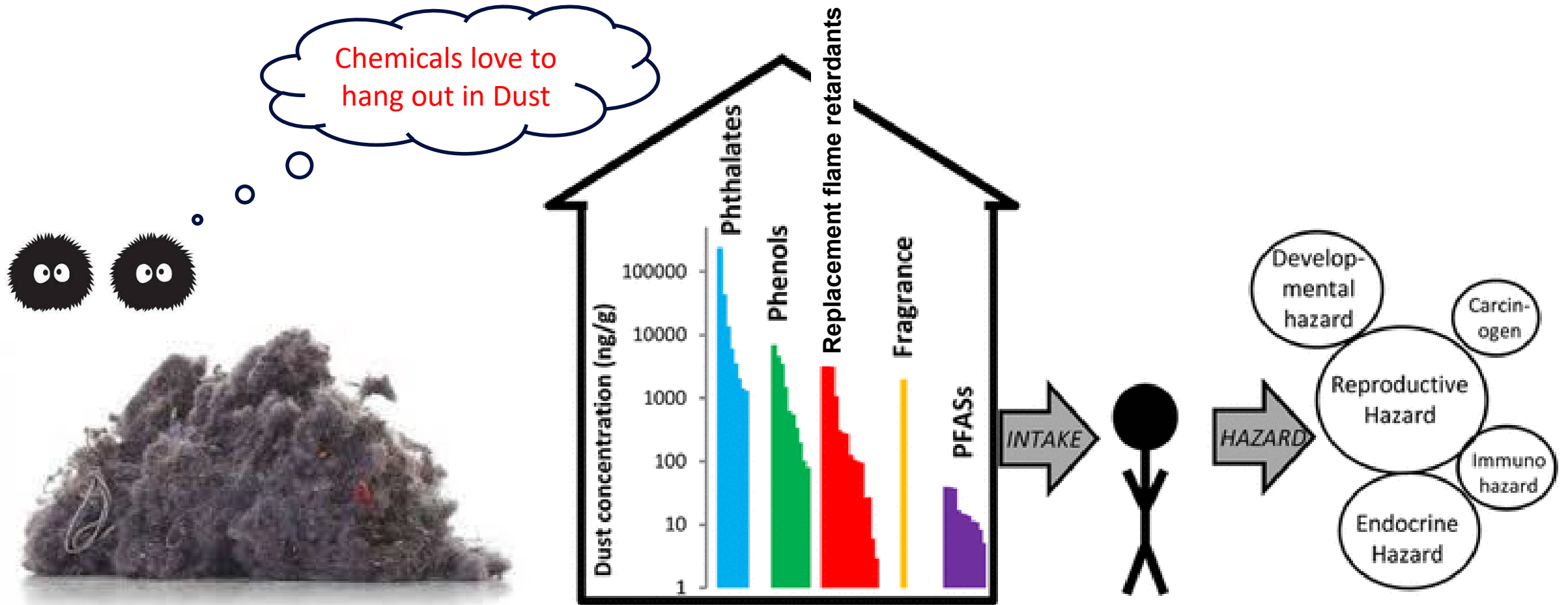




Children are doing their own thing

- ❖ Consuming more per body weight (and it's not just food)
- ❖ Crawling and exploring





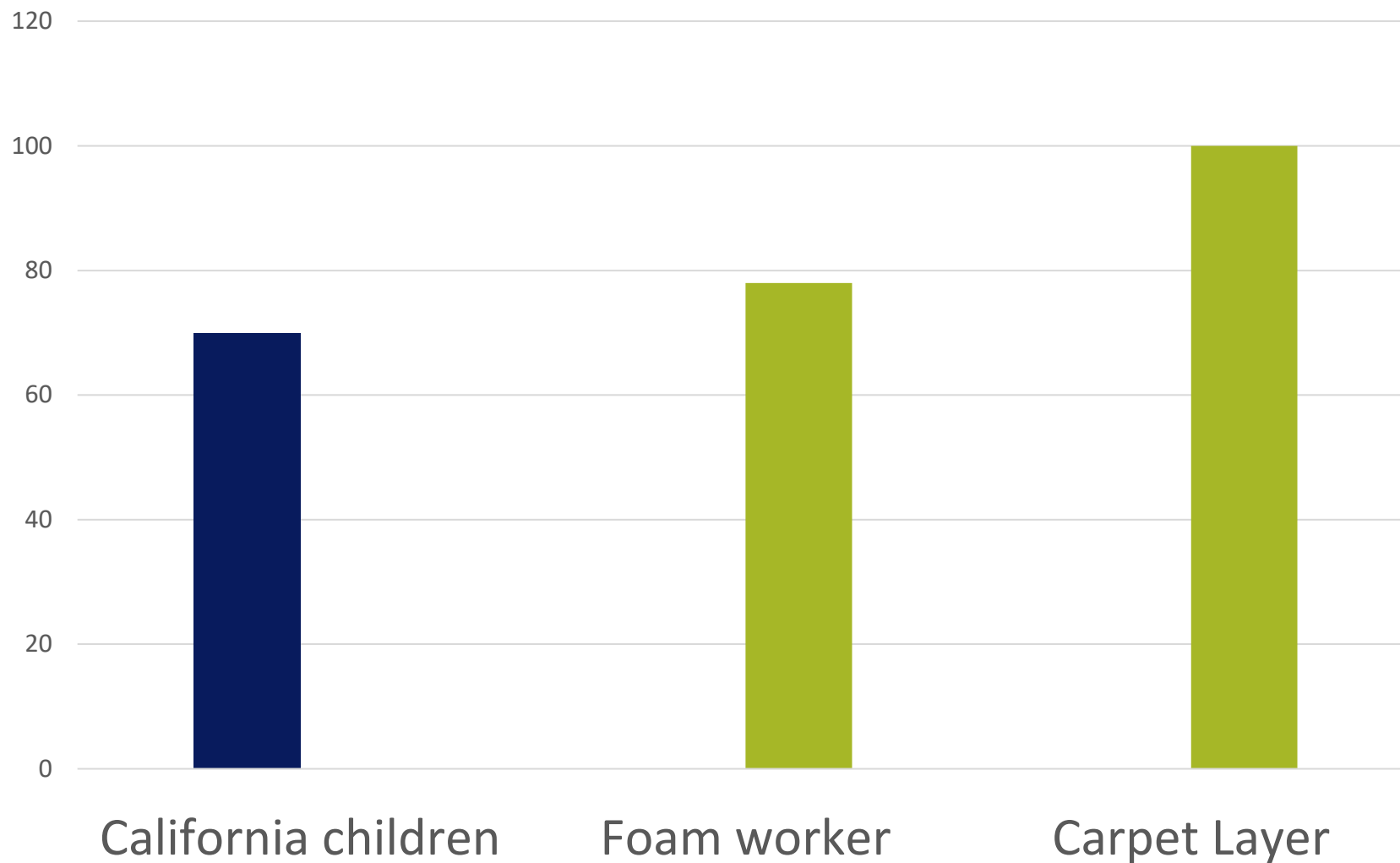
Many chemicals found in dust from.....

Consumer products - furniture, electronics, personal care and cleaning products,
 Building materials - floor and wall coverings, insulation, paint



Exposures to children comparable to occupational exposures

Levels of the Flame Retardant Chemical PBDE in Blood



*PBDE levels in **California children** (2-5 yo) are similar to levels in **occupationally exposed adults***



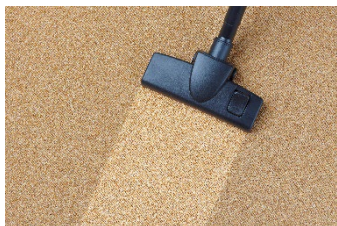
Multiple chemical exposures higher in Hispanic and Black women

	Benzophenones				Bisphenols			Fungicides		Herbicides		Neonicotinoids		OP insecticide Other insecticide		Pyrethroids		Parabens		Phthalate alternative		Phthalates																									
	BP8	4-OHBP	BP1	BPS	BPA	BPF	BPS	BPZ	2,4,5-T	PNP	PCP	2,4-D	ATZ	CLO	IMI	NDMA	NIT	THX	TCP	SUF	DCCA	FPBA	BzPB	BuPB	EtPB	MePB	PrPB	ΣDINCH	ΣDEHP	ΣDPHP	ΣDiDP	MHPP	MBzP	MEP	MiPP/MPrP	MMP	MnBP/MIBP	MOP	FLUOs	NAPs	PHENs						
Race/ethnicity ^a																																															
Non-Hispanic Black/Other/multiple	↑	↓	↓	↓	↑	↑	↑	↑	↓	↑	↑	↑	↑	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↑	↑	↑	↑	↓	↓	↓	↑	↓	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑		
Hispanic ethnicity	↑	↓	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↓	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↓	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑		

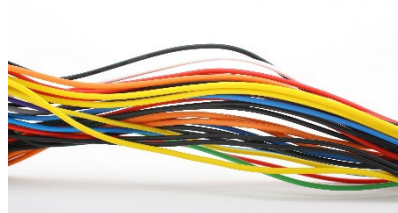
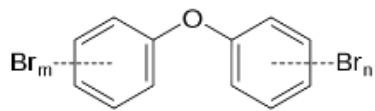
^a Compared to non-Hispanic White

 = positive association, p < 0.05
  = positive association, p < 0.2
  = negative association, p < 0.05
  = negative association, p < 0.2

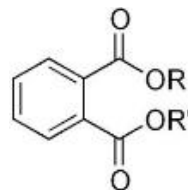




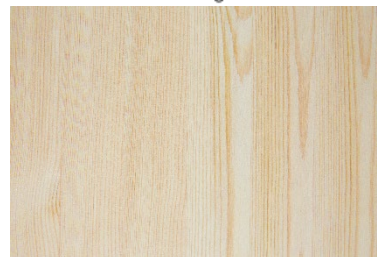
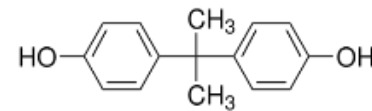
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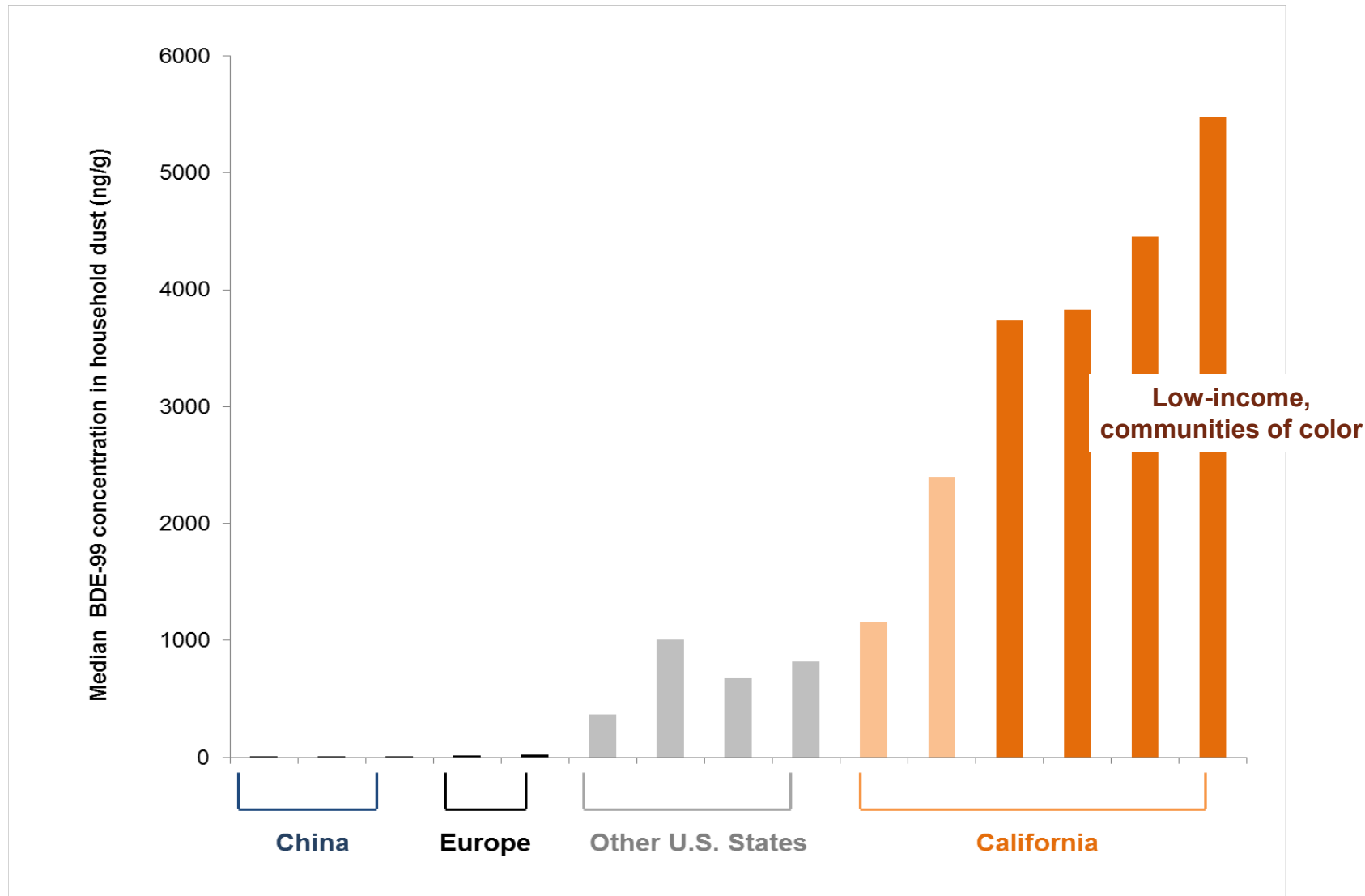
Phenols

Suspected or known to increase the risk of

- Neurodevelopmental outcomes (e.g. decreased IQ, ADHD)
- Cancer
- Reproductive outcomes (e.g. fertility, sperm quality, time to pregnancy)
- Metabolic disorders (e.g. obesity and diabetes)
- Disrupt hormone levels



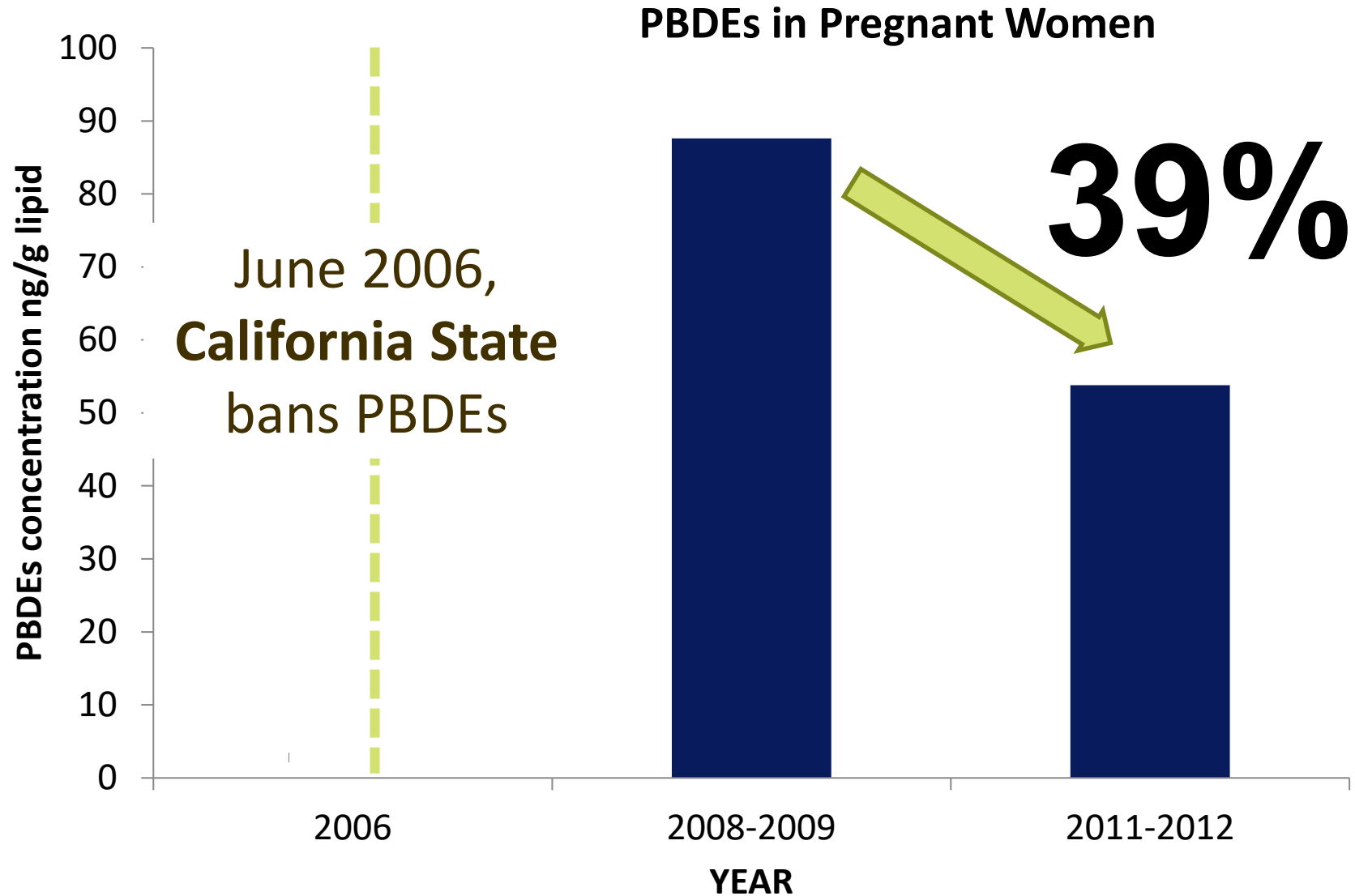
Chemicals in dust higher in low-income, communities of color



Zota A. et al. 2008 Environmental Science & Technology; Quirós-Alcalá L. et al. 2011 Environment International; Yuang et al. 2010 Chemosphere; Whitehead T. et al. 2012 13th Workshop on Brominated Flame Retardants



Actions Matter – Policy



Conclusions

- Exposures to toxic chemicals are ubiquitous.
- There are health inequities in exposures and outcomes
- Children and pregnancy are times of higher susceptibility
- Many chemical exposures come from the indoor/built environment
- But best available science is needed to upgrade approaches to protect health





Thank you!

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