



# We Are What We Eat:

## Non-Stick Chemicals, Plasticizers and Other Endocrine Disruptors in Our Food and Our Bodies

with EWG's Alexis Temkin, PhD



Know your environment.  
Protect your health.

# Endocrine Disrupting Chemicals: EDCs

“EDCs are chemicals that may interfere with the body’s endocrine system and produce adverse developmental, reproductive, neurological and immune effects” - NIEHS

Children and the developing fetus are particularly vulnerable to the health effects associated with EDC exposure

Exposure can contribute to development of chronic diseases

Children are also at risk for higher levels of exposure

1. Consumer more food and water per body weight relative to adults
2. Eat one type of food over and over again



# Routes of Chemical Exposure



**Inhalation**



**Dermal Absorption**  
Personal Care Products



**Ingestion through  
Drinking Water**



**Ingestion through  
Food**



# Which Chemicals Have Been Detected in Our Foods?

US FDA Total Diet Study monitors **800** contaminants and nutrients in food

USDA Pesticide Data Program monitors **450** pesticides and their breakdown products

Broad range of health effects including endocrine disruption, neurotoxicity and developmental toxicity

Heavy Metals

Carcinogens

Persistent Organic  
Pollutants (POPs)

Industrial Chemicals



# Are Humans Exposed to EDCs Through Food?



Dietary behavior trends influences exposure to chemicals



Fast food consumption



Mercury and POPs in seafood and meat

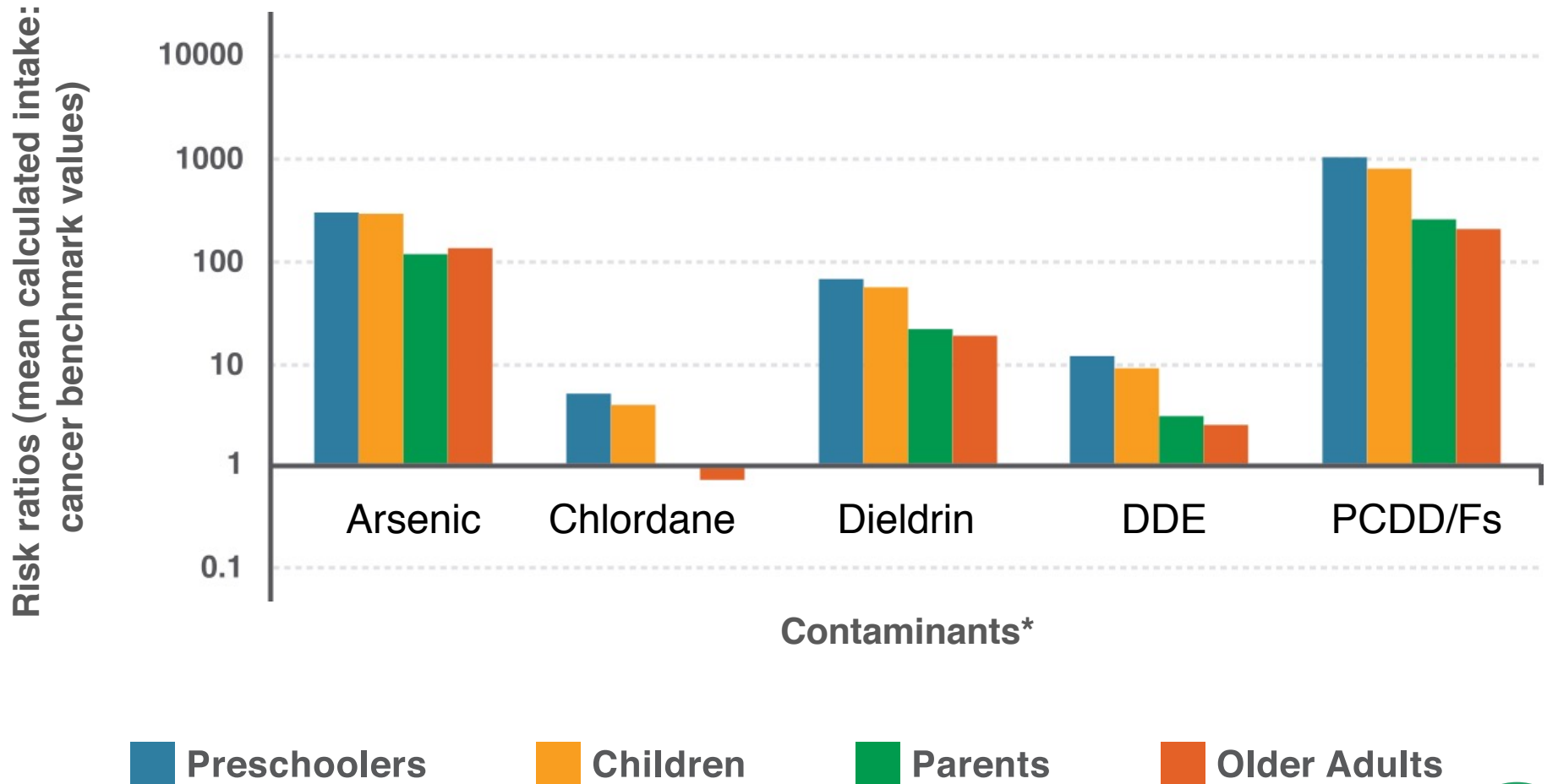


Pesticide residues are reduced in children on an organic diet

## Can exposures reach unsafe levels?



# Estimated Daily Intake of Food-Borne Toxins Above Cancer Benchmark Values



\*Cancer benchmarks available for listed contaminants only.

Source: Vogt et al. 2012 Environmental Health



# How Does Our Food Come to Contain EDCs and Other Contaminants?

## Intentional addition of chemicals to food

1. Food additives
2. Pesticide residue

## Accidental contamination of food with chemicals

1. Environmental bioaccumulation from legacy contaminants
2. Migration of food contact materials
3. Food processing



# Everything Added to Food in the US



## Food and Drug Administration

Over 4000 chemicals on the Food Additive List

GRAS – Generally recognized as safe

## Thousands of chemicals are approved as food additives

1. Many of these chemicals have not been fully evaluated for safety
2. Our understanding of how chemicals may pose health risks is changing and evolving
3. We see value reductions in limits deemed "safe"  
– not the other way around





A background image showing the hands of several children holding up ice cream cones. The cones have various flavors: white, green, pink, and yellow. In the background, a child's white t-shirt with a colorful parrot graphic is visible. A semi-transparent green banner is overlaid across the middle of the image.

# **SURFACTANTS & EMULSIFIERS**

Gut health as a toxicity endpoint



# SURFACTANTS & EMULSIFIERS

## Gut health as a toxicity endpoint

- The gut microbiome is emerging as an important component to understanding human disease
  - Obesity, inflammation, IBS and colon cancer
- Diet and chemicals can shift and alter gut microbiome populations
- Chemicals can change gut permeability and influence nutrient and chemical absorption
  - polysorbate 20, carboxy methyl cellulose, dioctyl sodium sulfosuccinate





# Chemicals as Food Contact Materials







# One week of food for a family in India and Guatemala



Fresh fruits and vegetables, limited processed grains and cereals, few canned and packaged goods.

Source: <http://world.time.com>







# One week of food for a family in North Carolina and California



Highly processed foods, food wrapped in plastics and other packages, few fresh fruits and vegetables.

Source: <http://world.time.com>



# Chemicals as Food Contact Materials

## Phthalates

PVC, plastics,  
lids, unknown  
sources

## Per and Poly Fluorinated Compounds

Food  
Wrappers,  
Paper &  
Board

## BPA & Other Bisphenols

Can linings as  
epoxy resins





# Phthalates

Plasticizers are chemicals added to plastics (PVC) to give them certain characteristics

- *Flexibility, malleability et.*

Not bound to plastic polymer and can leach/migrate from materials into foods



# Phthalates in Foods

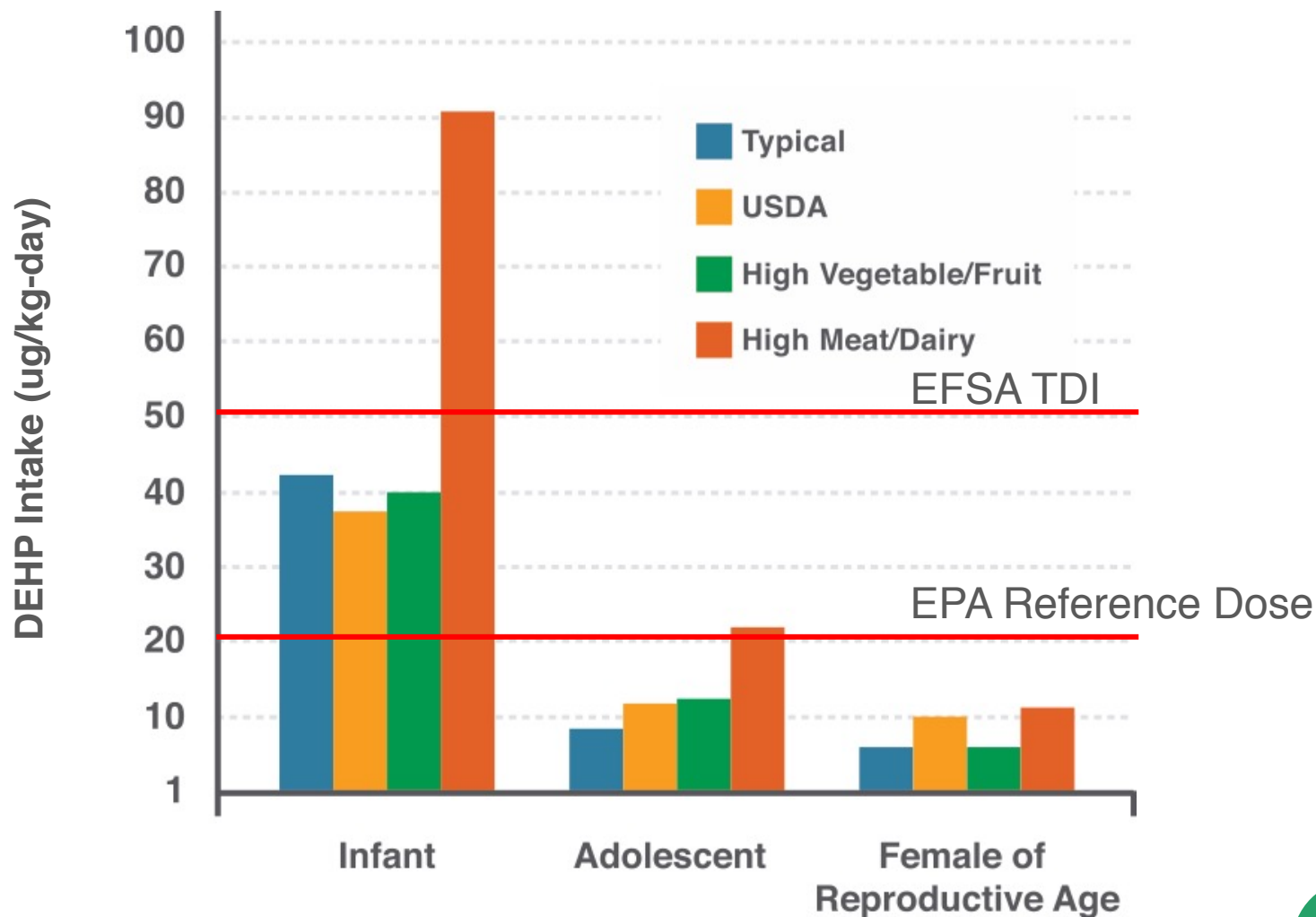
## Phthalates – antiandrogens

- Bread and dairy are highest exposure sources
  - Packaging? Processing?
- Have some regulations on use and migration limits in Europe
- Violations often found





# Estimated Daily Intake for the Phthalate DEHP Based on Diet and Life Stage



# BPA and other Bisphenols

## Can Linings and Canned Foods

Detected in 63 of 105 canned food samples at levels at up to 65 ng/g

## Regrettable substitution

1. BPA exposure is declining but we are beginning to see increases in other bisphenols – reports indicate they have very similar and sometimes more harmful toxicological properties
2. BPS has been shown to migrate above EU regulated specific migration limits



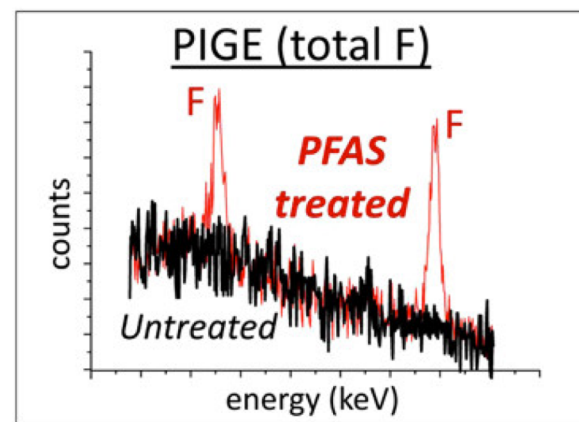
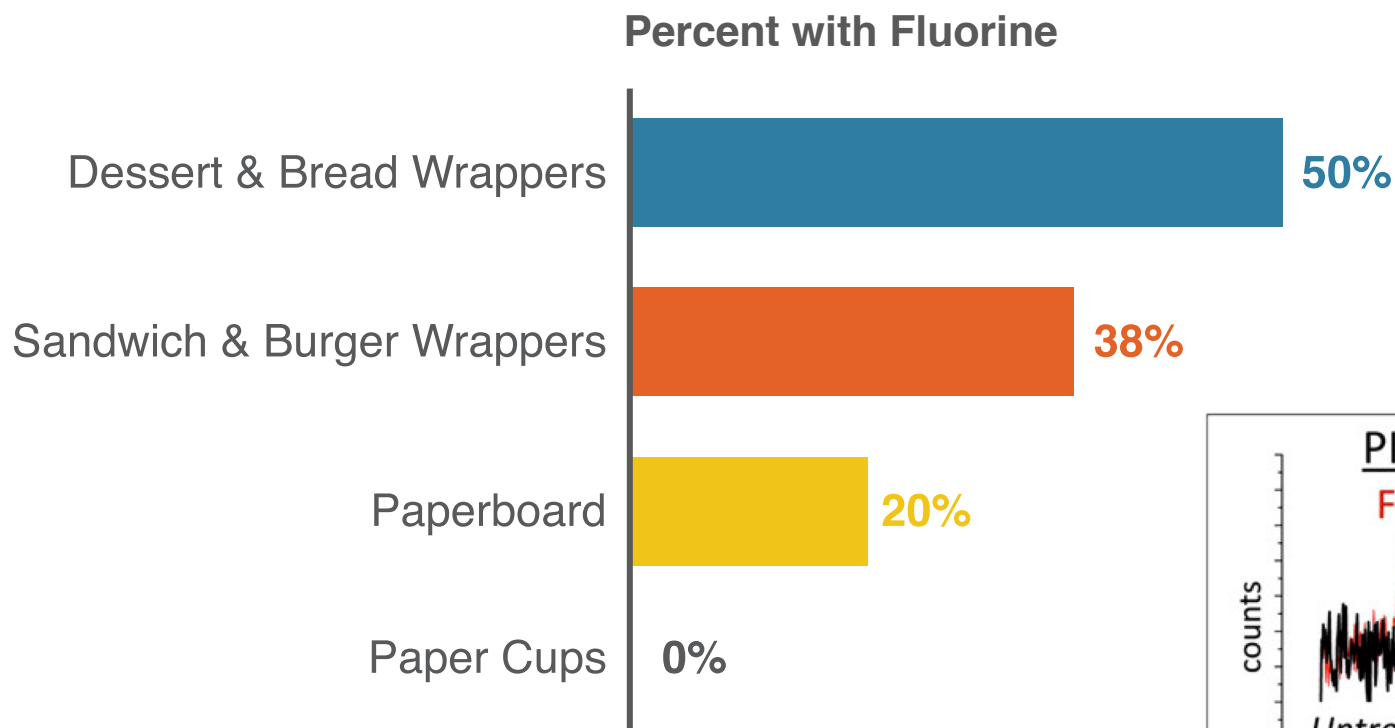
# Per and poly fluorinated compounds PFCs or PFAS

## Food Wrappers, Paper & Board

- **Health Effects**
  - Cancer, immune toxicity, low birth weight, obesity and increase in cholesterol, sex hormones
- **Function**
  - Non-stick chemicals
  - Used as grease, oil and water repellants



# Analysis of Fluorine Content in Representative Sample of Fast Food Packaging in the US



# Can You Reduce Your Exposure Through Diet?

Yes, but it's complicated...

Intervention studies can teach us what's in our food

## Phthalates

1. Spices – ground coriander
2. Dairy – butter, cream, milk and cheese





# Can You Reduce Your Exposure Through Diet?

## EWG's Dirty Dozen™ & Clean Fifteen™

*This years will be  
released in April*



# Support Chemical Policy Change

## Ingredient use and disclosure bills

- Washington state just passed HB 2658 to ban perflourinated chemicals in food packaging materials if alternatives can be found
- State and local legislatures are listening



# Take Away

- Food is a major route of human exposure to chemicals, many of which are EDCs
- Children may be particularly vulnerable to chemical exposures through food
- Phthalates, per and poly fluorinated chemicals and bisphenols are prevalent in foods likely due to their use in food contact materials
- Health effects and safety levels of mixtures of chemicals in foods are poorly assessed
- Dietary modification can influence/reduce exposures







Questions?