Early Life Exposures and Cancer
Research Perspective

Julia Brody, PhD
Silent Spring Institute

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www.SilentSpring.org
Government Center, Boston 1993

“A Lab of Our Own,” Brody et al. 2005 AJPH
22 years  80+ scientific articles  12 babies
1. Most cancer is not just due to inherited genes

Breast cancer risk profile in Europe:

Lichtenstein et al. 2000 N Engl J Medicine
2. Cancer is influenced at many stages of life

For breast cancer:
- Before birth
- During puberty
- First pregnancy
- Menopause
Prenatal exposures affect risk

• Higher risk:
  – Higher birth weight and length
  – Older mom and dad
  – Fraternal twin
    ◆ Radiation
    ◆ DES
    ◆ DDT

• Lower risk:
  – Identical twin
  – Maternal pre-eclampsia
Biological pathways to breast cancer

- Mammary carcinogens damage DNA
  - Ionizing radiation

- Endocrine disruptors as tumor promoters
  - Hormone replacement therapy

- Endocrine disruptors as developmental toxicants that alter susceptibility
  - DES
3. Many common chemicals are biologically linked to breast cancer.
Example mammary carcinogen exposures

- gasoline
- auto exhaust, air pollution
- paint remover, solvents
- flame retardants
- pesticides
- water disinfection byproducts
- nonstick coatings
Example endocrine disruptor exposures

- pesticides
- food packaging
- laundry detergent
- cosmetics
- fragrances
- plastics
- sunscreen
- furniture foam
- disinfectants

- Phthalates
- Parabens
- Alkylphenols
- Triclosan
- PFASs
Child Health and Development Study

DDT years


Blood sampled after birth

Cohn et al., 2007, 2015
DDT, PCBs in early life

Cohn et al., 2007, 2015
What kind of evidence?

President’s Cancer Panel 2010

“…an environmental health paradigm for long-latency diseases is needed to enable regulatory action based on compelling animal and in vitro evidence before cause and effect in humans has been proven.”

p.99
Cancer Prevention Science

Biological Mechanism + Human Exposure

Basis for Action

Strength of evidence, not “proof”

Educate, Regulate, Reformulate

Brody 2010, President’s Cancer Panel 2010, IOM 2011, IBCERCC 2013
4. People are widely exposed

- 67 EDCs, including 27 pesticides
- DDT in 2/3 of homes
- Phthalates in 100% of homes
- Parabens, alkylphenols - abundant
- Flame retardants – 10x Europe levels
- 100 of 120 homes above health guidelines

Rudel et al. 2003 Environmental Science & Technology
California house dust has highest levels of PBDE flame retardants

![Graph showing PBDE dust concentrations in different locations](image)

Zota et al. 2008. Environmental Science & Technology
Blood PBDE levels in Californians nearly two fold higher than rest of U.S.

\[ \sum \text{PBDEs} = \text{sum of BDE-28, -47, -99, -100, -153, -154} \]

\[ p = 0.002 \]

Zota et al. 2008. Environmental Science & Technology
5. Science can catalyze change!

NOTICE

THIS ARTICLE MEETS THE FLAMMABILITY REQUIREMENTS OF CALIFORNIA BUREAU OF ELECTRONIC AND APPLIANCE REPAIR, HOME FURNISHINGS AND THERMAL INSULATION TECHNICAL BULLETIN 117-2013. CARE SHOULD BE EXERCISED NEAR OPEN FLAME OR WITH BURNING CIGARETTES.

THE UPHOLSTERY MATERIALS IN THIS PRODUCT:

___ CONTAIN ADDED FLAME RETARDANT CHEMICALS

X CONTAIN NO ADDED FLAME RETARDANT CHEMICALS

THE STATE OF CALIFORNIA HAS UPDATED THE FLAMMABILITY STANDARD AND DETERMINED THAT THE FIRE SAFETY REQUIREMENTS FOR THIS PRODUCT CAN BE MET WITHOUT ADDING FLAME RETARDANT CHEMICALS. THE STATE HAS IDENTIFIED MANY FLAME RETARDANT CHEMICALS AS BEING KNOWN TO, OR STRONGLY SUSPECTED OF, ADVERSELY IMPACTING HUMAN HEALTH OR DEVELOPMENT.

Where to Buy a Safe Couch

Flame retardants are potentially harmful. Here's where to find couches that don't contain them.
Next: Rapid tests for safer products

Schwarzman et al. 2015, Environmental Health Perspectives
Detox Me
BY SILENT SPRING INSTITUTE

Download on the
App Store
ANDROID APP ON
Google Play
Take-home tips

1. Replace vinyl shower curtain with quick drying nylon
2. Look for paraben-, phthalate-, and fragrance-free products
3. Eat more fresh foods
4. Keep dust levels low with a damp cloth or vacuum with HEPA filter
5. Avoid products advertised as stain-resistant
Too Close to Home

Silent Spring Institute studies reveal that our exposure to harmful chemicals often hits too close to home. But these findings also offer guidance for reducing those exposures.

Ugly Ducklings
Cancer-associated phthalates were found in all the homes tested in the Household Exposure Study.

Beat the Wrap
Plastics found in food packaging can leach hormone-disrupting chemicals into food and drink.

silentspring.org/tooclosetohome/
Let's Make Prevention a Priority in 2017

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And help our researchers study levels of exposure to 10 common toxic chemicals in the U.S. population.

FEATURED RESEARCH

NEW
Fast food packaging contains potentially harmful chemicals

NEW
Toxic Chemicals Widespread in Household Dust

NEW
Study identifies sources of drinking water contamination for millions of Americans

Drugs and other contaminants found in private drinking wells

Lower doses of common pesticides that might pose a threat

Participants in Personal Cancer Prevention study