

# *Preconception Counseling: A Critical Window for Health Promotion*



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# 2008 President's Cancer Panel

Babies in the U.S. are being born  
“pre-polluted”

<http://deainfo.nci.nih.gov/advisory/pcp/pcp1208/04dec08stmt.pdf>

[http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rpt/PCP\\_Report\\_08-09\\_508.pdf](http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rpt/PCP_Report_08-09_508.pdf)

# NHANES 2003-2004

- Virtually every pregnant woman in the United States is exposed to at least 43 different chemicals.



Woodruff TJ, et al. Environmental chemicals in pregnant women in the United States: NHANES 2003-2004. *Environ Health Perspect* 2011;119:878–85.

# Fetal Origins Hypothesis



Barker DJ. Developmental origins of adult health and disease. *J Epidemiol Community Health* 2004; 58:114–5.

# Does BPA reach the fetus?

- Umbilical cord blood obtained from pregnant women undergoing 2<sup>nd</sup> trimester abortion - 100% had BPA
- Breast cancer fund 2013 publication:
  - “There is mounting evidence linking BPA exposure in the womb and soon after birth to health effects including breast cancer, prostate cancer, metabolic changes, decreased fertility, early puberty, neurological problems and immunological changes”
  - Negative health effects are shown from low-dose BPA exposure, (much lower than EPA’s “safe” dose (50 µg/kg body weight/day)

Gerona, RR, et al. 2013. BPA, BPA glucuronide, and BPA sulfate in mid-gestation umbilical cord serum in a northern California cohort. *Environ Science and Technology*  
<http://www.breastcancerfund.org/assets/pdfs/publications/disrupted-development-the-dangers-of-prenatal-bpa-exposure.pdf>



# The 1<sup>st</sup> environment



Average baby has > 200 environmental chemicals in umbilical blood at birth

<http://www.ewg.org/reports/bodyburden2/execsumm.php>

# Environmental exposures

- Endocrine disruptors
  - Pesticides
  - BPA
  - Phthalates
  - Arsenic
  - Cosmetics
  - Fragrances
- Plastics
- Hormones
- Antibiotics
- Perchlorate
- Electromagnetic fields





# Royal College of Obstetrics and Gynecologists

## Scientific Impact Paper No. 37

### May 2013

1. Use fresh food rather than processed foods
2. Reduce use of foods/beverages in cans/plastic containers, including their use for food storage
3. Minimize the use of personal care products such as moisturizers, cosmetics, shower gels and fragrances
4. Minimize the purchase of newly produced household furniture, fabrics, non-stick frying pans and cars whilst pregnant/nursing
5. Avoid the use of garden/household/pet pesticides or fungicides (such as fly sprays or strips, rose sprays, flea powders)
6. Avoid paint fumes
7. Only take OTC analgesics or painkillers when necessary
8. Do not assume safety of products based on the absence of 'harmful' chemicals in their ingredients list, or the tag 'natural' (herbal or otherwise)

# Sept 2013 Joint ACOG ASRM statement:

- Exposure to environmental chemicals and metals in air, water, soil, food, and consumer products is ubiquitous
- Virtually every pregnant woman in the US is exposed
- Chemicals can cross the placenta, and in some cases, (mercury) can accumulate in the fetus, resulting in higher fetal exposure than maternal exposure
- Prenatal exposure to environmental chemicals is linked to various adverse health consequences
- Recommendation: health professionals need to counsel their patients

[http://www.acog.org/About\\_ACOG/News\\_Room/News\\_Releases/2013/Environmental\\_Chemicals\\_Harm\\_Reproductive\\_Health](http://www.acog.org/About_ACOG/News_Room/News_Releases/2013/Environmental_Chemicals_Harm_Reproductive_Health)

# Does changing your diet help?

- 25 people, 5 days, vegetarian diet, at a Buddhist temple
- Measured levels of urinary excretion of antibiotic residues, phthalate metabolites and oxidative stress biomarkers
- Reduction in antibiotics and phthalates and oxidative stress biomarker



*Ji, K, et al. 2010. Influence of a five-day vegetarian diet on urinary levels of antibiotics and phthalate metabolites: Environmental Research. 2010*

# 2011 BPA study



- Bisphenol A
  - Used in plastics and liners of cans
  - 90% of us have BPA in our urine when it is tested
  - Increases the risk of breast and prostate cancer, obesity, infertility, diabetes, and ADHD
- Pilot study of 5 SF families
  - Freshly prepared catered meals with minimal use of canned foods
  - Urinary levels of BPA dropped by 66% in 3 days

Food Packaging and Bisphenol A and Bis(2-Ethyhexyl) Phthalate Exposure: Findings from a Dietary Intervention. Rudel RA et al April 2011, *Environ Health Perspectives*

# Contrasting Results

- RCT: 10 families, 5-day complete dietary replacement vs written recommendations to reduce phthalate and BPA exposures
  - followed phthalate and BPA concentrations in urine
- Results:
  - No significant changes were observed for written recommendation participants
  - Urinary di(2-ethylhexyl) phthalate (DEHP) concentrations increased unexpectedly from a median of 283 nmol/g at baseline to 7027 nmol/g during the intervention (P 0.0001)
  - Food DEHP revealed concentrations of 21,400 ng/g found in ground coriander and 673 ng/g in milk

Sathyanarayana S et al. Unexpected results in a randomized dietary trial to reduce phthalate and bisphenol A exposures *J Exposure Sci and Env Epidem* (2013), 1–7

# Environmental Self Assessment:

- Do you know which vegetables and fruits have the most pesticide contamination?
- Do you avoid fish that contain high levels of mercury and PCBs?
- Do you check the ingredients in your cosmetics, lotions, and shampoos for endocrine disruptors?
- Do you use green cleaning products?
- If you are planning to paint are you using no- or low-VOC paint?
- Do you use perfumes, scented candles, and/or air fresheners?
- Do you spray your house for bugs or have your lawn sprayed?
- Are you exposed to lead, X-rays, solvents, or chemotherapeutic agents at work?

# Environmental Health Recommendations

- Food recommendations:
  - Organic poultry and meat
  - Follow EWG Dirty dozen and clean fifteen or organic produce
  - Choose low mercury fish
- Food storage
  - Stainless steel water bottles with purified tap water
  - Glass or ceramic food containers for microwave or storage
- Personal care products
  - Use cosmetics database to assess
  - Avoid soap with triclosan
- Practices at home
  - Remove shoes at front door
  - Avoid insecticides
  - No VOC paint, avoid flame retardants



# March 2013

## CDC National Health statistics report:

- Autism rate: 2 in 100
- Birth defects: 3 in 100 (CNS, heart, GI, musculoskeletal, orofacial, chromosomal)
- 1 in 6 children have a neurodevelopmental disorder





# Can we prevent (some) autism?

- Folic acid
- SSRI use
- Seizure medication: valproate
- Environmental chemicals?
- Air pollution
- Advanced paternal age

- Schmidt, RJ et al. Prenatal Vitamins, One-carbon Metabolism Gene Variants, and Risk for Autism. *Epidemiology*: Vol 22 (4);476-485, July 2011.
- Roth, C et al. Folic Acid Supplements in Pregnancy and Severe Language Delay in Children. *JAMA*. 306(14):1566-1573, October 12, 2011.
- Surén P et al. Association between maternal use of folic acid supplements and risk of autism spectrum disorders in children. *JAMA*. 2013 Feb 13;309(6):570-7.
- Goh YI et al. Prenatal Multivitamin Supplementation and Rates of Congenital Anomalies: A Meta-analysis, *Journal of Obstetrical Gynecology Canada* 28(8): 680–89, 2006.
- Croen LA. et al. Antidepressant use during pregnancy and childhood autism spectrum disorder. *Arch Gen Psychiatry*. 2011 Nov;68(11):1104-12.
- Volk HE. et al. Traffic-Related Air Pollution, Particulate Matter, and Autism *Arch Gen Psychiatry*. 2012

# Precautionary Principle

“If there is good scientific information that an action or policy *may* harm the public or the environment, then even in the absence of conclusive proof that the action or policy is harmful, the burden falls upon those taking the action to demonstrate that it *will not* be harmful.”

# Resources for Patients

- [ewg.org](http://ewg.org)
- [treehugger.com](http://treehugger.com)
- [cosmeticsdatabase.com/](http://cosmeticsdatabase.com/)
- [healthystuff.org/](http://healthystuff.org/)
- [facebook.com/NoMoreDirtyLooks](https://www.facebook.com/NoMoreDirtyLooks)
- [Veritey.com](http://Veritey.com)
- *Be Fruitful: The Essential Guide to Maximizing Fertility and Giving Birth to a Healthy Child*  
Victoria Maizes MD (Scribner 2013)