

Greetings,

We are excited to share our recent newsletter for the Environment and Reproductive Health (EARTH) Study!

Thanks to your participation, we continue to learn more about the impact of the environment and diet on fertility and pregnancy outcomes among couples recruited from the Massachusetts General Hospital Fertility Center. In this newsletter, we describe a few of the study findings from the past year and provide examples of future research directions.

I want to take this opportunity to thank you again for making this work possible through your participation and also to thank the MGH faculty and Fertility Center staff. I would also like to recognize the excellent work performed by our research team at the Harvard T. H. Chan School of Public Health, especially our research nurses Jennifer Ford and Myra Keller.

Sincerely,

Dr. Russ Hauser, M.D., Sc.D., MPH
Professor, Harvard T.H. Chan School of Public Health and Harvard Medical School



PHYSICALLY DEMANDING OR SHIFT WORK DECREASES WOMEN'S FERTILITY

THESE TYPES OF JOBS have been linked to adverse reproductive outcomes. Therefore, the EARTH Study explored the effect of these occupational exposures on biomarkers of fertility. We found that women who reported moving or lifting heavy objects at work had lower total and mature oocyte yields and lower antral follicle counts (mark of ovarian reserve). The negative effect of heavy lifting on mature oocyte yield was stronger among overweight women and women ≥ 37 years. We also found that women working non-daytime schedules, consistently or on a rotating basis, had lower oocyte yields as well ([Minguez-Alarcón et al. *Occupational and Environmental Medicine* 2017](#)).

WHOLE GRAINS IMPROVE INFERTILITY TREATMENT OUTCOMES



IT IS GENERALLY ACCEPTED that whole grains are beneficial in preventing most chronic diseases. In EARTH Study participants, we found that women with higher whole grain

consumption in the year prior to infertility treatment had a higher probability of implantation and live birth. Higher intake of bran, whether naturally occurring or added to foods, appeared to be the component of whole grains that was driving this benefit. Our results highlights the importance of diet on fertility and reinforces the recommendation that whole grains should be consumed as part of a healthy diet ([Gaskins et al., *Fertility & Sterility* 2016](#)).

FOLATE AND VITAMIN B12 ENHANCES INFERTILITY TREATMENT OUTCOMES

THESE TWO VITAMINS cannot be produced in the body and must be supplied by the diet. A growing literature suggests that consumption of folic acid and vitamin B12 is not only important for the prevention of neural tube defects, but also for the ability to get pregnant and maintain a pregnancy to term. We measured the levels of these two vitamins in blood samples of women participating in the EARTH Study and found that women with the highest levels of folate and vitamin B12 had higher probability of live birth compared to women with lower levels. Our results support the importance of preconception folic acid supplementation and the benefits of vitamin B12 ([Gaskins et al., *American Journal of Clinical Nutrition* 2015](#)).

PHthalATES AFFECT INFERTILITY TREATMENT OUTCOMES

HUMAN EXPOSURE TO PHthalATES, a family of multifunctional chemicals used in personal care (e.g. body lotions, cosmetics, shampoos, deodorants) and consumer products (e.g. flooring, wall coverings, and food), is widespread and may be associated with adverse reproductive outcomes. Among women enrolled in the EARTH Study, we examined whether a woman's urinary phthalate concentrations were associated with reproductive outcomes following infertility treatment. First, we found higher urinary concentrations of some phthalate metabolites to be associated with lower oocyte yields and lower probability of clinical pregnancy or live birth following assisted reproduction. Second, we found that women with higher concentrations of some phthalate metabolites had a higher risk of very early pregnancy loss as well as a higher risk of pregnancy loss before 20 weeks gestation. These results highlight the potential for chemicals such as phthalates to affect reproductive outcomes, even at low general population exposure levels ([Hauser et al. *Environmental Health Perspectives* 2016](#); [Messerlian et al. *Epidemiology* 2016](#)).

CHILD FOLLOW-UP STUDY

WE ARE VERY excited to launch our new study on children of participants from the EARTH Study! More than 600 children have been born to participants in our study.



The new study is designed to better understand how your child's growth and health are related to environmental exposures during pregnancy. The EARTH Study is unique in that we have detailed information on environmental exposures and diet from both men and women. Our research nurses may contact you if you're eligible to participate.

For more information contact our research nurses:

Jennifer Ford and Myra Keller

At 617-643-2505 and EARTH@hsph.harvard.edu

Check out our website! <http://www.hsph.harvard.edu/earth>

Keep up with our most recent EARTH Publications here:
<https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/52248170/?sort=date&direction=ascending>

How can you decrease exposure to phthalates?

Food & Beverage

Common sources of exposure to phthalates are from food and beverage processing and packaging materials.

To reduce exposure:

- Reduce use of processed and packaged foods.
- Replace plastic bottles and food containers with glass or stainless steel.
- Avoid reheating food in plastic containers.

Perfumes & Personal Care Products

Products that list "fragrance" as an ingredient may contain phthalates. Phthalates are frequently used in some lotions, soaps, make-up, etc.

To reduce exposure:

- Use products listed as "phthalate-free".
- Reduce use of products with "fragrance". Instead use "fragrance-free" products.
- Use nail-polish that advertise "No Di-Butyl Phthalate" or "No DBP".

Household Goods

Flooring, blinds, shower curtains, electronics, and other PVC products can be a source of DEHP. Scented cleaning products, laundry detergent, synthetic air fresheners can contain phthalates.

To reduce exposure:

- Use PVC-free products: replace with cotton, bamboo or polyethylene vinyl acetate (PEVA).
- Use "fragrance-free" cleaning and laundry products.