

TITLE

Environmental Phthalate Exposure and Preterm Birth**AUTHOR(S)**

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ABSTRACTBackground:

According to the Centers for Disease Control and Prevention, approximately one out of every eight infants is born prematurely in the United States (US). Preterm birth is a leading cause of newborn mortality, with a variety of contributing causes and risk factors. Babies born prematurely may also have more health problems at birth and more long term health problems. Environmental exposures represent a group of understudied but potentially important factors contributing to preterm birth. Phthalates are a group of chemicals used to make plastics more flexible and harder to break. They are also used as solvents for other materials, and can be found in many common household and personal-care products such as deodorants, shampoos, soaps, skin moisturizers, perfumes, cosmetics, food packaging, and vinyl products such as vinyl toys and shower curtains. Biomonitoring studies have shown that phthalate exposure is widespread in the US population. The human health effects of phthalates are not yet fully known, but research increasingly shows that phthalates can mimic or suppress hormones (e.g., estrogen and testosterone) and disrupt normal development and growth. Studies have pointed to adverse health effects including developmental and reproductive problems, asthma, low sperm count, undescended testes, genital malformations, premature puberty, and development of some cancers. Previous studies of the relationship between phthalate exposure and preterm birth have been suggestive but not fully conclusive due to limitations in study design or in exposure assessment.

Objective:

This study examined associations between prenatal phthalate exposure and preterm birth.

Methods:

Women were recruited for a prospective observational cohort study from 2006-2008. Each provided demographic data, biological samples, and information about birth outcomes. From within this group the authors selected 130 cases of preterm births and 352 randomly assigned control participants, and they analyzed urine samples from up to 3 time points during pregnancy for levels of phthalate metabolites (breakdown products of phthalates). For each participant, the authors averaged the 3 phthalate metabolite levels measured in the urine samples to represent the average phthalate exposure during pregnancy, and then examined its association to preterm birth (defined as <37 weeks completed gestation) and spontaneous preterm birth (defined as preterm birth preceded by spontaneous preterm labor or preterm premature rupture of the membranes).

Results:

Overall, levels of two metabolites of a phthalate chemical known as DEHP and one metabolite of a phthalate known as DBP were higher in women who had preterm births, compared to women who delivered after 37 weeks. These findings were even stronger when analysis was limited to examining spontaneous preterm births alone.

Conclusion:

Women exposed to phthalates during pregnancy have significantly increased odds of delivering preterm. The authors propose a potential mechanism for the association—specifically that phthalate exposure is associated with increased intrauterine inflammation, which is associated with preterm birth.

POLICY IMPLICATIONS

Exposure to the two phthalates found to be associated with preterm birth in this study is widespread. DEHP exposure occurs primarily from the consumption of food and water contaminated by the migration of the phthalates from food packaging materials. DBP exposure occurs commonly from contact with personal-care products such as cosmetics, skin lotions, and perfumes.

Agencies tasked with phthalate regulation in the United States (US) include: the US Environmental Protection Agency (EPA)—regulation of chemical manufacturing and sales; the US Food and Drug Administration (FDA)—regulation of food and drug (including cosmetics) safety; and the US Consumer Product Safety Commission (CPSC)—regulation of consumer products (such as plastic toys and other products).

In 2010 the EPA initiated rulemaking to add 8 phthalates to the Concern List under the Toxic Substances Control Act (TSCA) and to add 6 phthalates not already on the Toxics Release Inventory as part of its overall phthalate action plan. The plan also included initiating rulemaking in 2012 under TSCA section 6(a) to regulate the 8 phthalates of concern. The proposed regulation would be informed by assessments conducted by the FDA, the CPSC's Chronic Hazard Advisory Panel, and EPA's Integrated Risk Information System. In August of 2011 EPA began a Design for the Environment and Green Chemistry alternatives assessment. Findings from this assessment may be used to encourage voluntary industry phase-out of phthalates or to inform regulatory action. Rulemaking has not begun.

The FDA developed an analytical method for determining the levels of phthalates in cosmetic products and conducted surveys of products to determine these levels in cosmetics on the market. According to the Agency's latest survey of cosmetics, conducted in 2010, DBP is now used rarely in cosmetics. FDA continues to monitor levels of phthalates in cosmetic products, but has determined that there isn't enough scientific evidence to support taking regulatory action against cosmetics containing phthalates.

The 2008 Consumer Product Safety Improvement Act, passed by Congress, banned six phthalates from some children's toys and products, to be regulated primarily by CPSC. Three phthalates (DEHP, DBP, and BBP) were permanently banned and three more (DINP, DIDP, and DnOP) are temporarily banned, pending assessment by the Chronic Hazard Advisory Panel.

Slow action at the national level has led numerous state legislators to introduce legislation to limit children's exposure to phthalates, especially through toys, baby bottles, and other common plastic infant's and children's products. Consideration must also be given to products that women of child bearing ages are exposed to on a daily basis.

REFERENCE

Article available in [JAMA Pediatrics](#).

KEY WORD(S)

[Phthalates](#), [Preterm births](#)