

TITLE

Asthma in Inner-City Children at 5–11 Years of Age and Prenatal Exposure to Phthalates: The Columbia Center for Children’s Environmental Health Cohort

AUTHOR(S)

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ABSTRACT

Background:

Phthalates are chemicals used primarily in the manufacturing of plastic in order to give plastic products more transparency, durability, flexibility, and longevity. Many types of phthalates are used in plastics. Diet exposes individuals to the greatest amount of phthalates through food and drink that have come into contact with a phthalate-containing plastic. Dust exposes individuals to phthalates, which is a greater risk to children than to adults due to their hand-to-mouth behavior. Common personal-care products, including shampoos, deodorants, soaps, skin moisturizers, perfumes, and cosmetics, may also contain phthalates. Many studies suggest that phthalate exposures during pregnancy may adversely affect child respiratory health and contribute to preterm births. Previous studies have shown an association between asthma and the presence of phthalates in the home environment.

Objective:

To examine associations between asthma diagnosed in children 5 to 11 years of age and prenatal exposures to butylbenzyl phthalate (BBzP or BBP), di-n-butyl phthalate (DnBP), di(2-ethylhexyl) phthalate (DEHP), and diethyl phthalate (DEP).

Methods:

Phthalate metabolites (products resulting from the body’s breakdown of phthalates) were measured in urine collected from 300 pregnant inner-city women participating in a longitudinal study. Potential mothers were excluded from participation if they reported tobacco use, drug use, diabetes, high blood pressure, or known HIV. Levels of phthalate metabolites were then compared to the child’s later asthma status. Children were examined by an allergist or pulmonologist based on the first parental report of wheeze, other respiratory symptoms, and/or use of asthma medication in the preceding 12 months on repeat follow-up questionnaires. Standard diagnostic criteria were used to classify children as either having or not having current asthma at the time of the physician examination. Children without any report of wheeze or the other asthma-like symptoms were classified as nonasthmatics at the time of the last negative questionnaire. Analyses were used to estimate relative risks while controlling for potential confounders.

Results:

Of 300 children, 154 (51%) were examined by a physician because of reports of wheeze, other asthma-like symptoms, and/or medication use; 94 (31%) were diagnosed with current asthma and 60 (20%) without current asthma. The remaining 146 (49%) children were classified as nonasthmatic. Compared with levels in nonasthmatics, prenatal metabolites of BBzP and DnBP were associated with a history of asthma-like symptoms and with the diagnosis of current asthma. Risk of current asthma was higher than 70% among children whose mothers had BBzP and DnBP metabolite concentrations during pregnancy in the highest third of observations.

Conclusion:

Prenatal exposure to BBzP and DnBP may increase the risk of asthma among inner-city children. However, because this is the first such finding, results require replication.

POLICY IMPLICATIONS

The Consumer Product Safety Improvement Act of 2008 (CPSIA) has set current regulations on the use of phthalates in children’s materials, including toys. As part of CPSIA, Congress has placed a permanent ban on the use of three different phthalates (DEHP, DnBP, and BBzP) in amounts greater than 0.1% (computed separately for each phthalate) in children’s toys and certain childcare articles. In addition, Congress has placed an interim ban on the use of three other phthalates (DINP, DIDP, DnOP) in amounts greater than 0.1% (computed separately for each phthalate) in a children’s toy that can be placed in their mouth and child care articles. However, both bans have a limited scope. For instance, child care articles are only regulated if they are intended for use of children 3 years of age or younger, and the interim ban only covers toys and their parts that are smaller than 5 centimeters. Furthermore, CPSIA does not consider products with phthalates to which pregnant women are exposed.

In December 2012, the U.S. Food and Drug Administration (FDA) issued guidelines to the pharmaceutical industry recommending they cease using DnBP and DEHP in drug products. Even though phthalates aren’t found in medical drugs in large quantities, phthalates have been used in the coatings on solid oral drug products, and safer alternatives for drug coatings exist. Regulations, rather than voluntary guidelines, would better protect adults and children from potential harm. FDA also monitors levels of phthalates in cosmetic products. According to the Agency’s latest survey of cosmetics, conducted in 2010, the use of phthalates in cosmetics has decreased considerably since the first survey in 2004, and FDA has determined that there isn’t enough scientific evidence to support taking regulatory action against cosmetics containing phthalates.

The U.S. Environmental Protection Agency (EPA) regulates the level of DEHP in water under the Safe Drinking Water Act, and the levels of DEHP and DnBP in ambient air under the 1990 Clear Air Act Amendments. Updating regulation has been difficult due to the Office of Management’s (OMB) rule review process. In 2013, EPA withdrew a proposed rule that would have added eight phthalates to the list of “chemicals of concern” that would have initiated further scrutiny and analysis about the potential impact of those phthalates on human health. The proposed rule had been held up in the Office of Information and Regulatory Affairs (OIRA), the division of OMB that is supposed to review agency rules, for more than three years. OIRA is supposed to take a maximum of 90 days to review agency rules. In summary, U.S. statutes and regulations do not adequately protect children and women of child-bearing age from potentially harmful exposures to phthalates. This study illustrates some of the potential health concerns resulting from the lack of such protections.

References

[Consumer Product Commission’s Regulation of Phthalates](#)
[FDA Guidelines on Limiting Phthalates in Pharmaceutical Industry](#)
[EPA Phthalates Action Plan](#)

REFERENCE

Article available in [Environmental Health Perspectives](#).

KEY WORD(S)

Phthalates, [EPA Phthalates TEACH Chemical Summary](#), [Asthma](#)