

Prenatal exposure to phthalates linked to decreased mental and motor development

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A newly published study by researchers at Columbia University's Mailman School of Public Health heightens concerns over the potential health effects on children of a group of ubiquitous chemicals known as phthalates. Phthalates are a class of chemicals that are known to disrupt the endocrine system, and are widely used in consumer products ranging from plastic toys, to household building materials, to shampoos.

Recent studies of school-age children have provided preliminary links between [prenatal exposure](#) to phthalates and developmental problems. The study is the first to examine prenatal [phthalate exposure](#) and the prevalence of mental, motor and behavioral problems in children who are in the preschool years. The paper, published online today in [Environmental Health Perspectives](#), adds to rising concerns about the risks associated with exposures to phthalates during pregnancy.

The study followed the children of 319 non-smoking inner-city women who gave birth between 1999 and 2006. Researchers, led by Robin M. Whyatt, DrPH, deputy director of the Columbia Center for Children's Environmental Health, measured [metabolites](#) of four phthalates in maternal urine as markers of prenatal exposure. The phthalates were: di-2-ethylhexyl phthalate, di-isobutyl phthalate, di-n-butyl phthalate and butylbenzyl phthalate. The study evaluated associations between prenatal exposures to these phthalates and child mental, motor and behavioral development at age 3 years.

The scientists used the Bayley Scales of Infant Development II, a well

validated developmental test, to assess the mental and motor development of the children. Behavioral problems were measured by asking mothers to complete the widely used 99-item Child Behavior Checklist (for ages 1½-5 years). Overall, researchers found that higher prenatal exposures to two of the phthalates significantly increased the odds of motor delay, an indication of potential future problems with fine and gross motor coordination. Among girls, one of the phthalates was associated with significant decreases in mental development. Prenatal exposures to three of the phthalates were also significantly associated with behavior problems including emotionally reactive behavior, anxiety/depression, somatic complaints and withdrawn behavior. These effects differed somewhat by child sex but were statistically significant among both boys and girls.

"Our results suggest that prenatal exposure to these phthalates adversely affects child mental, motor and behavioral development during the preschool years," said Dr. Whyatt, who is also professor of clinical Environmental Health Sciences. "The results add to a growing public health concern about the widespread use of phthalates in consumer products."

The actual mechanisms by which phthalates may affect the developing brain are still being explored. Dr. Whyatt points out that phthalates are endocrine disruptors—substances that affect hormone systems in the body. Evidence suggests that they impact the function of the thyroid gland. They also lower production of testosterone, which plays a critical role in the developing brain. "More work is needed to understand the biological effects of these commonplace substances," noted Dr. Whyatt.

"The results are concerning since increasing exposures from the lowest 25% to the highest 25% among the women in our study was associated with a doubling or tripling in the odds of motor and/or behavioral problems in the children," explained Pam Factor-Litvak, PhD, the senior

epidemiologist on the study. "However, the number of children with clinical disorders was small," stated Dr. Factor-Litvak. The authors point out that the phthalate exposures among the women in the study varied widely reflecting the range of exposures found in the U.S. population.

Provided by Columbia University

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