

# Phthalates potentially alter levels of a pregnancy hormone that influences sex development

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This is an image of a healthy baby. Exposure to hormone-altering chemicals called phthalates -- which are found in many plastics, foods and personal care products -- early in pregnancy is associated with a disruption in an essential pregnancy hormone and adversely affects the masculinization of male genitals in the baby, according to research led by the University of Pittsburgh Graduate School of Public Health. Credit: UPMC

Exposure to hormone-altering chemicals called phthalates - which are found in many plastics, foods and personal care products - early in pregnancy is associated with a disruption in an essential pregnancy hormone and adversely affects the masculinization of male genitals in the baby, according to research led by the University of Pittsburgh

Graduate School of Public Health.

The findings, presented today at the Endocrine Society's 97th annual meeting in San Diego and funded by the National Institute of Environmental Health Sciences, focus on the role of the placenta in responding to these chemicals and altering levels of a key [pregnancy](#) hormone. These results suggest that there may be reason to push routine clinical testing earlier in pregnancy to check for the effects of chemicals and help guide potential interventions to protect the health of the baby.

"Phthalates are pervasive," said Jennifer Adibi, M.P.H., Sc.D., assistant professor of epidemiology at Pitt Public Health. "Reducing exposure to phthalates and other hormone-disrupting chemicals is something that needs to be addressed at a societal level through consumer advocacy and regulation, and education of [health care providers](#)."

The research builds on a study led by Shanna S. Swan, Ph.D., of the Icahn School of Medicine at Mount Sinai that was published in February in the journal *Human Reproduction*. Dr. Swan is senior investigator on this presentation, which provides new information about how phthalates target a key pregnancy hormone called human chorionic gonadotropin (hCG), which is made by the placenta and can be measured in the mother's blood and urine.

"The placenta, which is an extension of the fetus and a target of the chemicals in our bodies, broadcasts information early in pregnancy, through hCG, about what might be occurring to the fetus from chemical exposure," said Dr. Adibi. "With a simple blood or urine test, doctors and pregnant women may be able to act on this information to reduce exposure and improve the long-term health of the future child."

Dr. Adibi and her colleagues analyzed data collected from approximately 350 women and their babies who participated in a multicenter

investigation called The Infant Development and the Environment Study (TIDES). Between 2010 and 2012, the women gave blood and urine samples in their first trimester of pregnancy and allowed researchers to take measurements of the babies at birth.

Higher levels of two molecules that are produced when phthalates are digested - mono-n-butyl and monobenzyl phthalate - in the mothers' urine early in pregnancy were significantly associated with lower levels of hCG in women carrying male babies and with higher hCG in those carrying female babies.

The new research also looked at hCG in relation to a biological marker called anogenital distance, which is the distance between the anus and genitals. In men, a short anogenital distance is associated with decreased sperm count and infertility.

Higher levels of hCG in the mother's blood were associated with a shorter [anogenital distance](#) in male babies. The researchers estimate that about 20 to 30 percent of the phthalate effect on the babies' genitals could be attributed to the influence of [phthalates](#) on hCG, specifically mono-n-butyl and mono-ethylhexyl phthalate.

"Our study is the first to look at hCG as a target of phthalate exposure in pregnancy," said Dr. Adibi. "There is growing societal concern over pediatric disorders that have a basis in the fetal period and which may be more common in one sex or another, such as autism, attention deficit disorder, obesity, asthma and infertility. It is important to find out if chemicals in our food or environment might influence these conditions."

The participants in this study were enrolled at prenatal clinics in California, Washington, Minnesota and New York. Dr. Adibi is looking ahead to future studies where she will enroll women in the earliest stages of pregnancy at clinics in Pittsburgh to assess exposures to endocrine

disruptors and measure effects on the placenta and the baby.

Provided by University of Pittsburgh Schools of the Health Sciences

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