

Exposure to 3 classes of common chemicals may affect female development

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Researchers at Mount Sinai School of Medicine have found that exposure to three common chemical classes—phenols, phthalates and phytoestrogens—in young girls may disrupt the timing of pubertal development, and put girls at risk for health complications later in life. The study, the first to examine the effects of these chemicals on pubertal development, is currently published online in the journal *Environmental Health Perspectives*.

"Research has shown that early pubertal development in girls can have adverse social and medical effects, including cancer and diabetes later in life," said Dr. Mary Wolff, Professor of Preventive Medicine and Oncological Sciences at Mount Sinai School of Medicine. "Our research shows a connection between chemicals that girls are exposed to on a daily basis and either delayed or early development. While more research is needed, these data are an important first step in continuing to evaluate the impact of these common environmental agents in putting girls at risk."

Phenols, phthalates and phytoestrogens are among chemicals known as endocrine disruptors, which interfere with the body's endocrine, or hormone, system. They are found in a wide range of consumer products, such as nail polishes, where they increase durability, and in cosmetics, perfumes, lotions, and shampoos, where they carry fragrance. Some are used to increase the flexibility and durability of plastics such as PVC, or are included as coatings on medications or nutritional supplements to make them timed-release.

Dr. Wolff, co-principal investigator Susan Teitelbaum, PhD, Associate Professor, [Preventive Medicine](#), and their team from Mount Sinai's departments of Pediatrics and Microbiology recruited girls from the neighborhood of East Harlem, a unique minority population considered high risk. Working with Cincinnati Children's Hospital and Kaiser Permanente Northern California, they analyzed the impact of exposure to environmental agents in a study that included 1,151 girls from New York, greater Cincinnati and northern California.

The girls were between 6- and 8-years-old at enrollment and between 7 and 9 at analysis. Researchers collected urine samples from the study participants and analyzed them for phenols, phthalates, and phytoestrogens, including 19 separate urine biomarkers.

The data showed that the three classes of [chemical](#) compounds were widely detectable in the study population, and that high exposure to certain chemicals was associated with early breast development. The strongest links were seen with phthalates and phytoestrogens, which were also among the highest exposures. One phenol, two phytoestrogens, and a subset of phthalates (those found in building products and plastic tubing) were associated with later puberty. However, the phthalates found in personal products such as lotion and shampoo, especially those with fragrance, were related to earlier breast and pubic hair development.

"We believe that there are certain periods of vulnerability in the development of the mammary gland, and exposure to these chemicals may influence breast cancer risk in adulthood," Dr. Wolff continued. "Dietary habits may also have an impact. Further study is needed to determine how strong the link is."

Consistent with previous studies, researchers also found that body-mass index (BMI) played a role in the onset of puberty. About a third of the

girls were considered overweight, which is also an indicator of early breast development. As a result, some of the chemical associations differed in more or less obese girls. Researchers continue to study the impact of diet on pubertal development and eventual breast cancer risk.

"Exposure to these chemicals is extremely common," Dr. Wolff continued. "As such, while the association between chemicals and pubertal development seems small, the impact on the overall population is significant."

More information: The data is published on Environmental Health Perspectives online at [ehp03.niehs.nih.gov/article/fe ...
tion?articleURI=info%3Adoi%2F10.1289%2Fehp.0901690](https://ehp03.niehs.nih.gov/article/view?articleURI=info%3Adoi%2F10.1289%2Fehp.0901690)

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