

Chemicals in personal care and household products linked to earlier puberty in girls

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Chemicals that are widely used in personal care and household products are linked to girls entering puberty at earlier ages, according to findings from a long-running study of mothers and children published today.

The study in *Human Reproduction*, one of the world's leading

reproductive medicine journals, found that chemicals such as phthalates, parabens and phenols were all associated with earlier puberty in girls, although there was no similar association observed in boys.

Certain phthalates are used in scented products such as perfumes, deodorants, soaps, shampoo, nail polish and cosmetics; parabens are often used as preservatives in cosmetics and other [personal care products](#); and phenols, which include triclosan and benzophenone-3, are used in soap, toothpaste, lipsticks, hairsprays, shampoos and skin lotion to increase the durability of the products.

Dr. Kim Harley, Associate Professor in Public Health at the University of California, Berkeley, USA, who led the study, said: "We found evidence that some chemicals widely used in personal care products are associated with earlier puberty in girls. Specifically, we found that mothers who had higher levels of two chemicals in their bodies during pregnancy—diethyl phthalate, which is used in fragrance, and triclosan, which is an antibacterial agent in certain soaps and toothpaste—had daughters who entered puberty earlier. We also found that girls with higher levels of parabens in their bodies at the age of nine entered puberty earlier.

"This is important because we know that the age at which puberty starts in girls has been getting earlier in the last few decades; one hypothesis is that chemicals in the environment might be playing a role, and our findings support this idea. Earlier puberty in girls increases their risk of mental health problems and risk-taking behaviour as teenagers and increases their risk of breast and ovarian cancer over the long-term, so this is an important issue to address."

Dr. Harley and her colleagues analysed data from [pregnant women](#) who enrolled in the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS) study between 1999-2000. They

followed 338 of their children from birth to adolescence. While the mothers were pregnant they were interviewed at around 14 and 27 weeks' gestation and [urine samples](#) were taken in order to measure concentrations of phthalates, parabens and phenols. After birth, the researchers assessed pubertal development in the 179 girls and 159 boys at the age of nine and collected urine samples. Pubertal development was checked again every nine months between the ages of 9 and 13.

Over 90% of urine samples showed concentrations of all the chemicals tested for, apart from triclosan, which was detected in 73% of samples taken from the pregnant mothers and in 69% of samples taken from the nine-year-old children.

For every doubling in the concentrations of an indicator for phthalates called monoethyl [phthalate](#) (MEP) in the mothers' urine, the development of pubic hair shifted 1.3 months earlier in girls. For every doubling of triclosan in the mothers' urine, the timing of the girls' first menstrual period shifted earlier by just under a month.

When the researchers looked at the urine samples taken from the children at the age of nine, they found that for every doubling in the concentrations of parabens, the timings of breast and pubic hair development and first menstrual period all shifted approximately one month earlier.

Dr. Harley said: "We already suspect that certain chemicals that are widely used in personal care products—like phthalates, parabens and triclosan—are endocrine disruptors. This means that they mimic, block or otherwise interfere with natural hormones in our bodies, such as oestrogen. In laboratory studies, these chemicals have been shown to cause earlier puberty in rats, but there are very few studies in humans. Additionally, we know that endocrine disrupting effects are particularly important during specific critical windows of development, such as in

the womb or during puberty. This study is important because it is one of the first studies to look at [human exposure](#) in the womb and because it gives us a chance to examine exposures both in the womb and at puberty."

She said a possible reason why the same association was not seen in boys was because different hormonal mechanisms are involved boys' puberty. The effects of the chemicals on oestrogen may be why girls are more affected.

The study was conducted in mainly Latino women, living in farm-working communities in California, USA; most had no high school diploma and lived below the US federal poverty threshold. When the researchers started the study 20 years ago, they were primarily interested in the effects of pesticides, which is why they chose this group of women. "But we always knew we would have the opportunity to examine other [chemical](#) exposures," explained Dr. Harley

One limitation of the study is that [girls](#) who start [puberty](#) early are more likely to start using [personal care](#) products, such as deodorants, which could be why parabens and phthalates showed in their urine. Exposure to other environmental chemicals, such as pesticides encountered during farm working, might also affect the results. A final limitation is that only one or two urine measurements were taken in the mothers and children, and regular measurements might have been better as indicators for phthalates, parabens and phenols only reflect exposure to them in the previous 24-48 hours.

Dr. Harley concluded: "This is still an active area of research and more studies are needed. However, we are concerned about evidence that some widely-used chemical in the products that we put on our bodies every day may be having an impact on hormonal and reproductive development."

Most people are exposed to phthalates, parabens and phenols. A previous study, the National Health and Nutrition Examination Survey (NHANES) in the US, found that more than 96% of women taking part had detectable concentrations of these chemicals in their urine.

More information: Kim G Harley et al, Association of phthalates, parabens and phenols found in personal care products with pubertal timing in girls and boys, *Human Reproduction* (2018). [DOI: 10.1093/humrep/dey337](https://doi.org/10.1093/humrep/dey337)

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