

Reducing Phthalate, Paraben, and Phenol Exposure from Personal Care Products in Adolescent Girls: Findings from the HERMOSA Intervention Study

Authors: Kim G. Harley, Katherine Kogut, Daniel S. Madrigal, Maritza Cardenas, Irene A. Vera, Gonzalo Meza-Alfaro, Jianwen She, Qi Gavin, Rana Zahedi, Asa Bradman, Brenda Eskenazi, and Kimberly L. Parra

ABSTRACT

Background:

Personal care products, such as cosmetics, toothpastes, soaps, deodorants and perfumes, are a source of exposure to chemicals including parabens, phthalates, phenols, and triclosan. These chemicals may interfere with the human body's endocrine system--a collection of glands that produce hormones which regulate the body's growth, metabolism, and reproductive development [\[1\]](#). Exposure to endocrine-disrupting chemicals (EDCs) have been linked with adverse developmental, neurological, reproductive, and immune effects, including lowered fertility, effects on brain, behavior, and metabolism, and some cancers.[\[2\]](#)

Exposure to EDC's in early childhood is particularly concerning as previous studies have suggested that some EDC's like BPA and phthalates are linked to adverse neurodevelopment behaviors in children[\[3\]](#). A survey of parabens and phthalates in consumer products found that compared to adult women, infants and toddlers were exposed to parabens 3x more[\[4\]](#). Furthermore, prenatal exposure to phthalates has also been found to cross the placenta and affect the developing fetus[\[5\]](#). As young women enter child-bearing years, it is important to equip them with information on how they can reduce their exposure to potential endocrine disrupting chemicals which can affect their unborn children.

Objective:

The research study was conducted to determine whether urinary concentrations of phthalates, parabens and phenols in teenage girls decreased after switching to low-chemical personal care products.

Methods:

In the Health and Environmental Research on Makeup of Salinas Adolescents (HERMOSA) intervention study researchers collected urine samples from 100 girls (14-18 years old) before and after they were instructed to replace their current personal care products with low-chemical alternatives for 3 days.

Researchers selected products labeled free of phthalates, parabens, triclosan and BP-3. Chemical concentrations of these chemicals from the urine samples were measured and compared pre and post intervention among HERMOSA participants, and also compared with concentrations of all females 14-18 years of age in the 2011-2012 National Health and Nutrition Examination Survey (NHANES). The NHANES is a program of studies designed to assess the health and nutritional status of adults and children in the United States.

Results:

Over 90% of the girls in HERMOSA confirmed that they used only the products provided by researchers during the intervention. However, 35% of the girls reported using soaps outside of those provided for the intervention at least once.

Pre-intervention, more than 90% of the girls were exposed to all chemicals analyzed in urine samples. Compared to girls aged 14-18 years in the NHANES, concentrations of all chemicals except triclosan were higher among HERMOSA participants. In particular, parabens and BP-3 were much higher.

The 3-day intervention in the HERMOSA study resulted in decreased concentrations of phthalates, parabens, triclosan and BP-3. Parabens methyl and propyl decreased by an average of 43.9% and 45.4%. However, parabens butyl and ethyl increased by 101% and 47.3% in half of participants. For triclosan, concentrations decreased by 65% overall and by 70% when the analysis was restricted to the girls who reported using triclosan-containing toothpaste pre-intervention.

Conclusion:

While chemical concentrations were not eliminated after the 3-day intervention, there were substantial decreases observed. Overall, the findings of this study suggest that by switching to low-chemical personal care products, consumers may be able to reduce their exposure to potential EDCs within just a few days.

POLICY IMPLICATIONS

The original 1938 Food, Drug, and Cosmetic Act (FDCA) provided the U.S. Food & Drug Administration (FDA) federal authority to oversee the safety of drugs and personal care products^[6]. Since enactment many standards for personal care products have not been updated, despite notable weaknesses. For instance, under the FDCA, FDA's authority to require safety testing and approval of cosmetic products prior to their entering the market is also limited. The agency can only mandate pre-market testing on color additives (other than those used in hair dyes)^[7]. In addition, the legal distinction between personal care products and drugs is not clear enough. Some products can be considered both under FDCA, and because drugs have stricter regulations than personal care products, ambiguity and under-regulation can occur^[8]. Moreover, the FDA cannot issue recalls on products deemed unsafe; the agency can only issue recommendations.

The FDA performs periodic testing and review of products already on the market, but often industry safety data of chemical ingredients is limited. Thus, only 11 chemicals since 1938 have been deemed unsafe for use in cosmetics. The safety concerns include carcinogenicity and reproductive developmental toxicity^[9]. However, this number is a stark contrast to the more than 1,300 banned and over 200 restricted by the European Union (EU). The EU's updated Cosmetic Regulations includes progressive amendments such as enlisting a "responsible person" that has an obligation to report serious adverse effects to authorities^[10].

The recent Personal Care Products Safety Act introduced by Senators Dianne Feinstein (D-California) and Susan Collins (R-Maine) to the Senate on April 20, 2015 was not passed before the end of the 114th Congress. The bill would have expanded FDA's authority for regulating cosmetic products including

registration of facilities and products, authority to recall, and requiring improvement of manufacturing practices. Also, it would have required the FDA to investigate the safety of at least five different cosmetic ingredients each year. The bipartisan bill had support from notable industry leaders^[11]. A new bill mandating pre-market testing and approval, personal care product regulations that are most protective of human health, and that specifically account for the most vulnerable populations, including children and women of childbearing age, is essential.

REFERENCE

[1] 9 Ways to Avoid Hormone-Disrupting Chemicals. Retrieved February 23, 2017 from <https://www.nrdc.org/stories/9-ways-avoid-hormone-disrupting-chemicals>.

[2] Endocrine Disruptors. Retrieved February 23, 2017 from <https://www.niehs.nih.gov/health/topics/agents/endocrine/>.

[3] Early-life exposure to EDCs: role in childhood obesity and neurodevelopment. (2017). *Nature Reviews*. Retrieved February 24, 2017 from <https://www.brown.edu/academics/public-health/epidemiology/sites/brown.edu.academics.public-health/epidemiology/files/uploads/nrendo.2016.186%20Braun.pdf>.

[4] A Survey of Phthalates and Parabens in Personal Care Products from the United States and Its Implications for Human Exposure. (2013). *Environmental Science and Technology*. Retrieved February 24, 2017 from <http://pubs.acs.org/doi/pdf/10.1021/es4042034>.

[5] Phthalates. *Project TENDR*. Retrieved February 24, 2017 from <http://projecttendr.com/chemicals-and-pollutants/phthalates/>.

[6] The 1938 Food, Drug, and Cosmetic Act. (2017). *Fda.gov*. Retrieved 24 February 2017, from <https://www.fda.gov/AboutFDA/WhatWeDo/History/ProductRegulation/ucm132818.htm>

[7] Cosmetics Q&A: Why are cosmetics not FDA-approved? (2017). *Fda.gov*. Retrieved 24 February 2017, from <https://www.fda.gov/Cosmetics/ResourcesForYou/Consumers/ucm135709.htm>

[8] Are all "personal care products" regulated as cosmetics?. (2017). *Fda.gov*. Retrieved 24 February 2017, from <https://www.fda.gov/ForIndustry/FDABasicsforIndustry/ucm238796.htm>

[9] Ingredients found unsafe for use in cosmetics. (2017). *Cosmetic Ingredient Review*. Retrieved 24 February 2017, from <http://www.cir-safety.org/sites/default/files/U-unsafe%202-02-2012%20final.pdf>

[10] Legislation - Growth - European Commission. (2017). *Growth*. Retrieved 24 February 2017, from https://ec.europa.eu/growth/sectors/cosmetics/legislation_en

[11] S.1014 - 114th Congress (2015-2016): Personal Care Products Safety Act. (2017). *Congress.gov*. Retrieved 24 February 2017, from <https://www.congress.gov/bill/114th-congress/senate-bill/1014>

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