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## The Environmental Injustice of Beauty: Framing Chemical Exposures from Beauty Products as a Health Disparities Concern

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### Abstract

The ObGyn community has issued a call to action to prevent toxic environmental chemical exposures and their threats to healthy human reproduction. Recent committee opinions recognize that vulnerable and underserved women may be disproportionately impacted by environmental chemical exposures and recommend that reproductive health professionals champion policies that secure environmental justice. Beauty product use is an understudied source of environmental chemical exposures. Beauty products can include reproductive and developmental toxicants such as phthalates and heavy metals; however, disclosure requirements are limited and inconsistent. Compared to White women, women of color have higher levels of beauty product-related environmental chemicals in their bodies, independent of socioeconomic status. Even small exposures to toxic chemicals during critical periods of development, such as pregnancy, can trigger adverse health consequences such as impacts on fertility and pregnancy, neurodevelopment, and cancer. In this commentary, we seek to highlight the connections between environmental justice and beauty product-related chemical exposures. We describe racial/ethnic differences in beauty product use such as skin lighteners, hair straighteners, and feminine hygiene products as well as the potential chemical exposures and health risks associated with these products. We also discuss how targeted advertising can take advantage of mainstream beauty norms to influence use of these products. Reproductive health professionals can use this information to advance environmental justice by being prepared to counsel patients who have questions about toxic environmental exposures from beauty care products and other sources. Researchers and health care providers can also promote health-protective policies such as improved ingredient testing and disclosure for the beauty product industry. Future clinical and public health research should consider beauty product use as a factor that may shape health inequities in women's reproductive health across the life course.

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## Keywords

toxic environmental chemicals; environmental justice; cosmetics; endocrine-disrupting chemicals; health disparities; reproductive environmental health

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## Introduction

The American Congress of Obstetrics and Gynecology (ACOG) committee opinion<sup>1</sup> emphasizes that toxic environmental chemicals are a threat to human reproduction and there may be differential vulnerability by life stage or social position. More recently, doctors around the world echoed these concerns through the International Federation for Obstetrics and Gynecology (FIGO) committee opinion. FIGO recommended that reproductive health professionals recognize disproportionate burdens to toxic chemical exposures in certain patient populations and champion policies that secure environmental justice.<sup>2</sup> Environmental justice integrates concepts of environmental racism and inequality and is defined as the unequal distribution of environmental benefits and pollution burdens based on race.<sup>3</sup> An understanding of how both social and environmental factors may jointly influence health is necessary for the elimination of health disparities.<sup>4</sup> The Environmental Protection Agency definition, adopted by FIGO, elaborates on this principle for regulatory purposes and defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income”.<sup>2, 5</sup>

Beauty product use is an understudied source of environmental chemical exposures and may be one avenue for health professionals to intervene among vulnerable populations such as women of color. Consumer products, and personal care products specifically, are a source of exposure to toxic chemicals for all women.<sup>6–8</sup> Beauty products (one category of personal care products) have limited and inconsistent disclosure of chemical ingredients and most lack adequate data on health and safety.<sup>6, 9</sup>

Racial/ethnic differences in beauty product use are documented across multiple categories including skin care, hair care, and feminine hygiene (Table 1). However, evidence points to the limits of examining these exposures in isolation. Rather, we argue that health practitioners should consider an “environmental injustice of beauty” approach, which incorporates the social factors that influence beauty product use and the potential for cumulative impacts that may arise due to co-occurring environmental exposures. This approach provides a more comprehensive picture of how environmental factors may shape reproductive health disparities.

## Pre-existing vulnerabilities and cumulative impacts

Beauty products contain multiple chemicals that can adversely impact health, such as formaldehyde, phthalates, parabens, lead, mercury, triclosan, and benzophenone.<sup>6, 9, 10</sup> Exposure to one or more of these chemicals has been linked to endocrine disruption, cancer, reproductive harm and impaired neurodevelopment in children.<sup>11–14</sup> Women ages 18 to 34 are more likely to be “heavy buyers”, purchasing more than ten types of products a year.<sup>15</sup> These women and their offspring may experience heightened vulnerability to toxic

environmental chemicals if products are used during sensitive periods of development such as preconception or pregnancy.<sup>2</sup> Low-income and racial/ethnic minority groups may be further susceptible since they are more frequently exposed to multiple environmental and social risk factors and face poorer health outcomes.<sup>16</sup> Nationally representative data of US reproductive-aged women suggest that women of color have higher levels of certain endocrine-disrupting chemicals, such as phthalates and parabens, in their bodies compared to White women, and these racial/ethnic differences are not explained by socioeconomic status.<sup>17–20</sup> Workers in the beauty industry, who are predominantly women of color and immigrant women, can also face occupational health hazards from chemicals in professional cosmetic products and ad-hoc workplace safety standards.<sup>21–23</sup> Cumulative assessments of environmental risk factors among socially marginalized groups have historically prioritized place-based pollution sources, such as polluting industries or high traffic density,<sup>24, 25</sup> however, beauty product exposures may be elevated in some of the same communities that encounter disproportionate exposures to place-based pollution.<sup>26, 27</sup>

## Social and economic dimensions of product use

The beauty product industry is estimated at \$400 billion globally.<sup>28</sup> According to market analyses and consumer profiles, multicultural beauty products have outpaced the overall cosmetics market.<sup>29</sup> Black consumers purchase nine times more ethnic hair and beauty products than other groups,<sup>30, 31</sup> and disproportionately purchase hair relaxers and straighteners. Latinos are the fastest growing ethnic beauty market segment<sup>32</sup> and Asian Americans spend 70% more than the national average on skin care products.<sup>33</sup>

Mass distribution of images that idealize Whiteness can influence sales of hair straighteners, skin lighteners, and odor masking products.<sup>34, 35</sup> Racial discrimination based on European beauty norms can lead to internalized racism, body shame, and skin tone dissatisfaction, factors that can influence product use to achieve straighter hair or lighter skin. Thus, beauty product use may be one way that structural discrimination becomes biologically embedded.<sup>36, 37</sup>

Targeted racial/ethnic marketing can influence product use and related health inequities by taking advantage of mainstream beauty norms.<sup>38, 39</sup> In a well-described example of the influences of marketing practices on health disparities, highly targeted menthol cigarette marketing in low-income inner city African-American neighborhoods<sup>38, 39</sup> created a racialized geography of tobacco-related health disparities.<sup>40</sup>

Below, we document evidence of demographic differences in product use and chemical exposures in the beauty industry. We then describe how external factors, such as targeted advertising, can influence product use.

## Skin-lightening face creams

Women in Africa, India, the Middle East, Southeast Asia, and the Americas regularly use skin-lightening cosmetics.<sup>41, 42</sup> Skin-lightening creams can contain hydroquinone, topical corticosteroids, or inorganic mercury.<sup>43</sup> Multiple cases of mercury poisoning, characterized by damage to the kidneys and the central nervous system, have been reported following use

of skin-lightening products.<sup>44</sup> The US Food and Drug Administration set a maximum allowable level of 1 ppm of mercury in skin products.<sup>45</sup> However, skin products with mercury continue to be unregulated and available outside of the US, and these products are still used by certain populations in the US, including Dominican and Mexican American women.<sup>45–47</sup> In a population-based study of New York City residents, those with the highest urine mercury levels were foreign-born Dominican women of reproductive age, and skin-lightening creams were identified as a source of exposure among highly-exposed populations.<sup>45</sup> Similarly, a medical case study reported that a pregnant Mexican American woman's elevated blood mercury level of 15 µg/L (nearly 3 times the CDC early reporting threshold) was linked to face creams that contained over 20,000 ppm of mercury.<sup>46</sup>

Skin-lightening creams are sold globally, marketed to darker skinned women. Scholars point to the success of the global skin lightening industry as evidence for the global preference for white/light skin<sup>42, 48</sup> and colorism, a social hierarchy based on gradations of skin color that discriminates against darker skin.<sup>42</sup> A study of 45 skin bleaching products sold in Harlem, New York found product marketing of skin lighteners traffics in derogatory images that devalue Black skin in order to sell these products.<sup>49</sup> Lighter skin tone is an important predictor of higher self-esteem for Black women and is associated with higher educational attainment and earnings among women of color.<sup>50, 51</sup>

## Hair relaxers and straighteners

Compared to White women, African American and African Caribbean women are more likely to use a greater number and variety of hair products<sup>52</sup>, and to have their hair chemically or professionally treated.<sup>31</sup> Use of these products often begins at an early age; in a survey of 201 African American girls, almost half of the parents/guardians reported first application of chemical relaxers to their child's hair between the ages of 4 and 8.<sup>53</sup> Hair products used by Black women are more likely to contain placenta (a potential source of estrogen hormones)<sup>54, 55</sup> as well as industrial chemicals such as parabens<sup>52</sup> that affect estrogenic pathways.<sup>56</sup> Premature reproductive development, such as breast budding, was documented in African American girls exposed to estrogen- or placenta-containing hair products.<sup>57</sup> Use of ethnic hair products among African American women has been associated with increased risk of earlier menarche<sup>58</sup> and uterine fibroid tumors<sup>59</sup>. It has also been proposed as a plausible risk factor for excess premenopausal breast cancer risk observed among African American women.<sup>60</sup>

Hair valuations of “good” (straighter/longer) and “bad” (tightly coiled/kinky) hair can place burdens on Black women to change their hair texture.<sup>61, 62</sup> Black women suffer more hair-related anxiety and are twice as likely than White women to experience social pressure at work to straighten their hair.<sup>63</sup> For example, the US army historically banned several hairstyles traditionally used by African American women, such as twists and multiple braids, in favor of styles that encouraged straightening or other practices to change hair texture.<sup>64</sup>

## Feminine hygiene and other fragranced products

Black women are more likely than White women to use vaginal douches as well as other fragranced feminine cleansing products such as sprays and wipes.<sup>19</sup> In a nationally representative sample of reproductive-aged women, those who reported frequent douching had 150% higher exposures to diethyl phthalate (DEP), a chemical commonly found in fragrances, than douche non-users.<sup>19</sup> Differences in DEP exposures between Black and White women were no longer statistically significant after accounting for douching practices, suggesting that vaginal douching may contribute to racial/ethnic disparities in phthalates exposure. Prenatal exposure to DEP can alter maternal sex steroid hormone concentrations during pregnancy<sup>65</sup> and may increase the risk of adverse health outcomes in offspring.<sup>66, 67</sup> Vaginal douching can also increase risks of bacterial vaginosis<sup>68</sup> and pelvic inflammatory disease<sup>69</sup>, and has been discouraged by ACOG.<sup>70</sup>

Use of talc powder on the genitals is another practice that is disproportionately practiced by US Black women.<sup>71</sup> Talc-based body powder is a possible human carcinogen when used in the genital areas. A pooled analysis of epidemiologic studies found a 24% increased risk of ovarian cancer from genital powder use.<sup>72</sup> These risks may be greater among Black women than White women.<sup>73, 74</sup>

Odor discrimination is a less described but important driver of the feminine cleansing practices described above. According to Ferranti<sup>75</sup>, imagined odor of African American women was historically used as a basis for moral judgement and an attempt to control sexual behavior. As a result, African American women deodorized and douched in order to be identified with sexual virtue. Advertisers employed targeted marketing towards Black women with messages that encouraged self-consciousness of potential vaginal odors. These habits became embedded as a cultural norm, and now persist outside of marketing efforts.<sup>75</sup>

## Conclusions

ObGyn providers should be aware of the potentially toxic effects of commonly used beauty products, recognize disparities across these demographics, and be prepared to counsel patients who have questions about these and other environmental exposures. While there are few published clinical guidelines, emerging consortiums with published scientific consensus statements can provide support to clinicians.<sup>1, 76</sup> Health professional societies can also promote health-protective policies, including improved ingredient testing and disclosure. Lastly, health scientists can collaborate in research to help address existing data gaps. Research on the “exposome”, or the totality of a person’s environmental exposures from conception to death, is a priority for the National Institutes of Environmental Health Sciences.<sup>77</sup> Researchers are trying to integrate beauty products into the exposome by characterizing the biologic activity of beauty products using *in vitro* study designs<sup>56</sup> as well as estimating the joint effects of chemicals and psychosocial stress on reproductive endpoints.<sup>78</sup> Future research should also consider the heterogeneous social and economic factors that drive product use. Collectively, this multi-pronged approach can help advance the ACOG and FIGO recommendations to secure environmental justice and advance health equity.

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**Condensation**

Racial/ethnic differences in cosmetic use occur across multiple product categories. Racialized beauty norms may influence product use, toxic chemical exposures, and contribute to health inequalities.

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**Table 1**

Examples of disproportionate beauty product exposures among vulnerable populations

External factors	Vulnerable populations	Product use	Chemical exposures	Potential adverse outcomes
Colorism	Dark skinned women (globally)	Skin lightening creams	Mercury	Mercury poisoning, neurotoxicity, kidney damage
Hair texture preferences	US Black women	Hair relaxers and other hair care products	Parabens and estrogenic chemicals from placenta	Uterine fibroids, premature puberty, and endocrine disruption
Odor discrimination	US Black women	Vaginal douches and other feminine care products	Phthalates and talc powder	Gynecological cancers and endocrine disruption

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