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(This category highlights potential health issues from fragrance chemicals and fragranced products.)

Download the poster to share: <https://www.fragrancefreecoalitionusa.com/>

Go Fragrance Free: Healthier Air Has Never Been Easier

Many hospitals, businesses, and employees are not aware that fragranced products can create access barriers to their facilities and can adversely affect the health of those working there. Fragranced products include fragranced cleaning products, hand sanitizers, lotions, laundry products, deodorant, air fresheners or any other scented items.

FEMININE HYGIENE PRODUCTS

*Tampons, Pads, Washes, Wipes,
Creams, Douches, Panty Liners (containing masking fragrances / Odor Control)*

1. Volatile organic compounds in feminine hygiene products sold in the US market: A survey of products and health risks

Lin N, Ding N, Meza-Wilson E, Manuradha Devasurendra A, Godwin C, Kyun Park S, Batterman S. Volatile organic compounds in feminine hygiene products sold in the US market: A survey of products and health risks. Environ Int. 2020 Nov;144:105740. doi: 10.1016/j.envint.2020.105740. Epub 2020 Aug 28. PMID: 32866732; PMCID: PMC7958867.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/32866732/> - PDF

“**VOCs** are components of FHPs (feminine hygiene products) that **are added as fragrances**, adsorbents, moisture barriers, adhesives, and binders...Most of the larger non-target peaks were identified as **fragrances, such as linalool, eucalyptol and benzyl acetate**. Feminine hygiene products (FHPs) are used on highly permeable and sensitive vaginal and vulvar tissues by many women. These products contain a variety of chemicals, and few regulations require disclosure of their ingredients....”

“Products labeled as “organic,” “natural,” or “for sensitive skin” did not necessarily have lower VOC concentrations....**menstrual pads had hazard ratios** of up to 11, **sprays and powders** had hazard ratios of up to 2.2 and excess cancer risks of up to 2.1×10^{-6} , and **washes** had **excess cancer risks** of up to 3.3×10^{-6} . Our data suggest that **all tested FHPs contained some toxic VOCs...**”

“Exposure to high concentrations or long-term exposure of VOCs has been associated with many known or suspected effects including **irritation to eyes, skin and nose; damage to the respiratory system, liver and kidney; reproductive effects; and carcinogenicity**”

“Examples of notable VOCs include **benzene**, a known carcinogen (US EPA, 1998), 1,4-dioxane, a likely carcinogen (US EPA, 2013), and naphthalene, a possible carcinogen due to possible genetic toxicity (Schreiner, 2003; US EPA, 1999). Health risks (carcinogenic or non-carcinogenic) related to the use of FHPs over the lifecourse remain unanswered.”

[Note: Fragrance is considered the new ‘second hand smoke’, “[The parallels between second-hand smoke and synthetic fragrance use are many. At its core, both are battles over indoor air quality](#) “ - quote and link from

De Vader, Christy L. & Barker, Paxson.

Chemicals that cigarettes/cigarette smoke and fragranced products can have in common are: Acetone, Formaldehyde, Benzene, acetaldehyde, terpenoids and phenols.]

2. Sanitary pads and diapers contain higher phthalate contents than those in common commercial plastic products

Park CJ, Barakat R, Ulanov A, Li Z, Lin PC, Chiu K, Zhou S, Perez P, Lee J, Flaws J, Ko CJ. Sanitary pads and diapers contain higher phthalate contents than those in common commercial plastic products. *Reprod Toxicol.* 2019 Mar;84:114-121. doi: 10.1016/j.reprotox.2019.01.005. Epub 2019 Jan 16. PMID: 30659930; PMCID: PMC6504186.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/30659930/>

“VOCs increase the risk for neurocognitive impairment, asthma, congenital disability, and cancer. Notably, exposure to methylene chloride, toluene, and xylene are known to negatively affect the development and function of reproductive system.”

“...sanitary pads in direct contact with the skin around the external genitalia were likely causing menstrual irregularities. The skin of this area tends to be thinner and more absorbent than those...such as the hands.”

“Exposure to phthalates is known to affect the development and functions of the cardiovascular, reproductive and endocrine systems.”

“...daily absorption of toluene from sanitary pad reached to the maximum of 38.4% RfD. Given the fact that women are exposed to various chemicals through various routes, consideration should be given to the risks of chemicals that are additionally absorbed from the sanitary pad.”

[Note: Phthalates are [synthetic](#) odorless plasticizers used as solvents, binders or fixatives [in many fragrances](#).

Why are phthalates [in the news](#)? [Phthalates](#) are considered Endocrine Disrupting Chemicals.

On the [California Safe Cosmetics Program Product Database](#): [DEP](#), [DIDP](#), and [DBP](#) are reported as fragrance while [DEHP](#) and [DBP](#) are perfume solvents. [IFRA](#) lists [DEP](#) and [DMP](#), as “reported fragrance ingredients”.]

[Note: Toluene (often a nail polish thinner) is used as a solvent or fragrance in perfume and bath products on the [CSPC Product Database](#). [Toluene](#) is on the [IFRA](#) list and on the EPA's [Priority Pollutant List](#).]

3. Development and application of a novel method to assess exposure levels of sensitizing and irritating substances leaching from menstrual hygiene products

Marcelis Q., Gatzios A, Deconinck E, Rogiers V, Vanhaecke T, Desmedt B. Development and application of a novel method to assess exposure levels of sensitizing and irritating substances leaching from menstrual hygiene products,

Emerging Contaminants, Volume 7, 2021, Pages 116-123, ISSN 2405-6650, <https://doi.org/10.1016/j.emcon.2021.02.004>.

Article Link: <https://www.sciencedirect.com/science/article/pii/S2405665021000068?via%3Dihub> - [PDF](#)

“All fragrance chemicals selected for the method development are classified as **skin sensitizers** category 1B...Six products were found to leach at least one of the following five sensitizing and irritating compounds: α -isomethyl ionone, **benzyl salicylate**, **hexyl cinnamaldehyde**, **linalool** and **piperonal**. Piperonal was the **most abundant compound leaching** from the MHPs, with leaching concentration levels measured to **28.22 $\mu\text{g/g}$** . In addition, the **leaching level of benzyl salicylate was found to be 11.03 $\mu\text{g/g}$** . **The latter fragrance concentration is above 10 $\mu\text{g/g}$ and would trigger mandatory labelling if the Cosmetic Regulation would apply for MHPs. However, none of the identified and quantified skin sensitizers were mentioned on the package.”**

4. Ubiquity, Hazardous Effects, and Risk Assessment of Fragrances in Consumer

Products

Pastor-Nieto MA, Gatica-Ortega ME. Ubiquity, Hazardous Effects, and Risk Assessment of Fragrances in Consumer Products. *Curr Treat Options Allergy*. 2021;8(1):21-41. doi: 10.1007/s40521-020-00275-7. Epub 2021 Jan 23. PMID: 33520600; PMCID: PMC7825391.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/33520600/> - [PDF](#)

“**Fragrances** are the most frequent chemicals causing contact **dermatitis**.... **It is difficult for sensitized patients to avoid contact with fragrances, due to their ubiquity and because manufacturers are not willing to volunteer information regarding fragrance ingredients**.... The incidence of **dermatitis** from cosmetics is difficult to determine. Sometimes, it is mild and consumers do not seek medical care but simply stop using the product. Some **fragrance-sensitized patients** do not even suspect their **allergy**.”

“Some **fragrances** are **carcinogens, mutagens, and toxic to reproduction** (CMR substances), thus classified with H341, H351, or H360. **Respiratory, neuroendocrine, and psychological effects** have also been discussed.”

“Absorbent **hygiene products** (tampons, panty liners, and sanitary pads) **contain fragrances (limonene, linalool, citronellal, geraniol, hydroxycitronellal, hexyl cinnamal, and benzyl salicylate)**. Some contain fragrances above 10 µg/g. Over-the-counter diaper products contain **M. pereirae (MP; balsam of Peru)**. These **products pose high sensitization risk** (applied to moist-occluded areas)... **Anaphylaxis** involving a nurse assaulted by a patient who sprayed perfume in her eyes was reported.”

“Fragrances have **neurotoxic and neurostimulatory effects**. **Chemically intolerant fragrance-sensitive mothers were found three times more likely to have a child with autism**.”

5. Chemicals of concern in personal care products used by women of color in three communities of California

Johnson PI, Favela K, Jarin J, Le AM, Clark PY, Fu L, Gillis AD, Morga N, Nguyen C, Harley KG. Chemicals of concern in personal care products used by women of color in three communities of California. *J Expo Sci Environ Epidemiol*. 2022 Nov;32(6):864-876. doi: 10.1038/s41370-022-00485-y. Epub 2022 Nov 2. PMID: 36323919; PMCID: PMC9628299.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/36323919/> - [PDF](#)

“We found that 65% of labels included CoCs, and 74% of labels had undisclosed ingredients listed as “**fragrance**.” The most prevalent chemicals were parabens, cyclosiloxanes, and **formaldehyde releasers**. GCxGC-TOFMS found additional CoCs, including **fragrances**, solvents, preservatives, ultraviolet filters, and contaminants.”

“This study is one of the first **detailed assessments of chemicals of concern** found in various types of PCPs used by several racial/ethnic groups. We found that over half of the 546 products selected by community partners as marketed to and/or used by them contained ingredients linked to cancer, reproductive or developmental harm, or endocrine disruption. Laboratory analysis identified additional chemicals in a subset of products, including **unlabeled fragrance chemicals and contaminants**. Elucidating exposures to chemicals in PCPs is important for risk assessment and health inequity research.”

“U.S. Black women report higher use of scented intimate care products, which is associated with higher

urinary metabolites of **diethyl phthalate** [16] and higher blood levels of 1,4-dichlorobenzene and **ethylbenzene**, which can be **fragrance additives** [17].”

“A separate analysis of 25 personal care products documented the presence of **carcinogens**, **EDCs**, **respiratory toxicants**, and **developmental toxicants**, and found that nearly **80% of those chemicals** were **fragrance ingredients** exempt from labeling requirements [27].”

“The fragrance ingredient **lilial**, which is a **reproductive toxicant** prohibited by the European Union, was common in hair and skin products.”

“Of the 23 intimate care product labels we examined, including washes, sprays, powders, moisturizers, douches, and wipes, over 60% had **undisclosed fragrance ingredients**. We found undisclosed fragrance ingredients on 85% of all deodorant or perfume product labels, and the specific fragrance ingredients, **lilial** and **galaxolide**, were each listed on 10% of deodorant/perfume products.”

6. Feminine Hygiene Products-A Neglected Source of Phthalate Exposure in Women

Gao CJ, Wang F, Shen HM, Kannan K, Guo Y. Feminine Hygiene Products-A Neglected Source of Phthalate Exposure in Women. Environ Sci Technol. 2020 Jan 21;54(2):930-937. doi: 10.1021/acs.est.9b03927. Epub 2020 Jan 9. PMID: 31859481.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/31859481/>

“**Phthalates have been associated with reproductive toxicity and precocious puberty in females**, but the occurrence of these toxicants in feminine hygiene products is rarely reported. In this study, eight phthalates were determined in 120 feminine hygiene products (56 feminine care products and 64 sanitary napkins) collected from China. **Phthalates were found in 86% and 98% of feminine care products and sanitary napkins**, respectively, with the total concentrations varying between not detectable and 813 µg/g (median: 0.26 µg/g) and 0.25 and 8.76 µg/g (1.43 µg/g), respectively. **Diethyl phthalate**, dibutyl phthalate, and bis(2-ethylhexyl)phthalate were the major compounds, accounting for >60% of the total concentrations.”

[Note: Phthalates are **synthetic** odorless plasticizers used as solvents, binders or fixatives **in many fragrances**. Why are phthalates **in the news**? **Phthalates** are considered Endocrine Disrupting Chemicals. On the **California Safe Cosmetics Program Product Database**: **DEP**, **DIDP**, and **DBP** are reported as fragrance while **DEHP** and **DBP** are perfume solvents. **IFRA** lists **DEP** and **DMP**, as “reported fragrance ingredients”.]

7. Sensitizing fragrances in absorbent hygiene products

Desmedt B, Marcelis Q, Zhilivoda D, Deconinck E. Sensitizing fragrances in absorbent hygiene products. Contact Dermatitis. 2020 May;82(5):279-282. doi: 10.1111/cod.13472. Epub 2020 Feb 5. PMID: 31951286.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/31951286/>

“Allergenic fragrances are present in a wide range of products but they are not regulated in all industries to the same extent. In Europe, absorbent hygiene products (AHPs) are only covered by the general product safety directive and therefore **fragrances can be used freely...**”

“...the consumer is unaware that these products can contain allergens. Indeed some of these products **do not even disclose the presence of perfume**. They only vaguely indicate the presence of fragrances by using

attributes such as “fresh”. **The results show that allergenic fragrances can be present at concentrations that would require individual labeling if the cosmetic legislation would be applied.**”

8. The associations between phthalate exposure and insulin resistance, β -cell function and blood glucose control in a population-based sample

Dales RE, Kauri LM, Cakmak S. The associations between phthalate exposure and insulin resistance, β -cell function and blood glucose control in a population-based sample. *Sci Total Environ.* 2018 Jan 15;612:1287-1292. doi: 10.1016/j.scitotenv.2017.09.009. Epub 2017 Sep 8. PMID: 28898934.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/28898934/>

“**DEHP metabolites** were also associated with **increased glucose** concentrations, and **indicators of β -cell function and insulin resistance**. Our results suggest that exposure to **phthalates** may possibly **impair control of blood glucose** and thereby **predispose to pre-diabetes**.”

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9. Occurrence and Distribution of Phthalates in Sanitary Napkins from Six Countries:

Implications for Women’s Health

Tang Z, Chai M, Cheng J, Wang Y, Huang Q. Occurrence and Distribution of Phthalates in Sanitary Napkins from Six Countries: Implications for Women's Health. *Environ Sci Technol.* 2019 Dec 3;53(23):13919-13928. doi: 10.1021/acs.est.9b03838. Epub 2019 Nov 18. PMID: 31694371.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/31694371/>

“Chemicals in feminine hygiene products **can exert adverse health effects as a result of strong absorptive capacity of the vagina and vulva**. We measured the concentrations of 15 phthalates in sanitary napkins collected from six countries and found total concentrations in the range of 1733-11942 ng/g. **Di(isobutyl)phthalate (DiBP)**, **bis(2-ethylhexyl)phthalate (DEHP)**, and **di-*n*-butyl phthalate (DnBP)** were the dominant congeners, representing a median of 27.3, 26.7, and 20.4% of the total median phthalate concentrations across all countries, respectively.... The estimated intake (at the 90th percentile) of **DiBP**, **DnBP**, and **DEHP** from sanitary napkins approximately represented 6.35-23.6, 3.35-9.90, and 1.06-9.57%, respectively, of the total exposure, indicating that sanitary napkins are a relevant source of exposure to these chemicals.”

“Most phthalates are used as additives that are not chemically bound to the product matrix and therefore can easily migrate and enter the human body. Exposure to phthalates can exert serious adverse effects on human health, including **estrogenic effects that impair the endocrine system**.... In addition, some phthalates can cause various **reproductive and developmental conditions**....”

“Hauser et al. found that urinary concentrations of **bis(2-ethylhexyl)- phthalate (DEHP)** metabolites in women undergoing in vitro fertilization were **inversely associated with oocyte yield and clinical pregnancy**. Some epidemiologic studies have reported associations between **prenatal exposure to phthalates** and adverse outcomes at birth, such as **congenital diseases and developmental delays**.... Lien et al. reported that

prenatal exposure to some phthalates can increase aggressive behavior problems in 8-year-old children.”

“**Phthalates readily accumulate in biological tissues** owing to their higher lipophilicity... Increasing evidence shows that **dermal contact from the use of cosmetics and personal care products is another relevant route of exposure to phthalates**. Sanitary napkins are used to absorb menstrual blood, and their constituents may be contaminated with phthalates. ... Sanitary napkins come into direct contact with the vulva, and the **mucous membranes in the vagina and vulva can rapidly absorb chemicals without metabolizing them**.... Serum estradiol levels following the vaginal application of estradiol have been shown to be 10-fold higher than levels following oral dosing,... indicating possible health risks from this exposure route”

[**Note:** [Phthalates](#) are [synthetic](#) odorless plasticizers used as solvents, binders or fixatives [in many fragrances](#). Why are phthalates [in the news](#)? [Phthalates](#) are considered Endocrine Disrupting Chemicals. On the [California Safe Cosmetics Program Product Database](#): [DEP](#), [DIDP](#), and [DBP](#) are reported as fragrance while [DEHP](#) and DBP are perfume solvents. [IFRA](#) lists DEP and DMP, as “reported fragrance ingredients”.]

10. Phthalates*, bisphenols, parabens*, and triclocarban in feminine hygiene products from the United States and their implications for human exposure

Gao CJ, Kannan K. Phthalates, bisphenols, parabens, and triclocarban in feminine hygiene products from the United States and their implications for human exposure. Environ Int. 2020 Mar;136:105465. doi: 10.1016/j.envint.2020.105465. Epub 2020 Jan 13. PMID: 31945693

Article Link: <https://pubmed.ncbi.nlm.nih.gov/31945693/> - [PDF](#)

“The estimated exposure doses of **phthalates**, parabens, and bisphenols through the dermal absorption pathway from the use of pads, panty liners, and tampons were significant.”

“**Elevated exposure to phthalates has been associated with precocious puberty, endometriosis, female genital tumors, and ovulation disorders**. ...**high concentrations phthalates have been measured in sanitary pads**.”

“In addition, pads, panty liners, and tampons are made from polypropylene (PP) and polyethylene (PE) materials, which can contain plasticizers such as phthalates, to increase the products’ flexibility. Dimethyl phthalate* (DMP), **diethyl phthalate* (DEP)**, **dibutyl phthalate* (DBP)**, **di-iso-butyl phthalate (DIBP)**, **di(2-ethylhexyl) phthalate* (DEHP)**, methyl paraben (MeP), and ethyl paraben (EtP) were found in all pad, panty liner, and tampon samples.”

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11. Developmental Exposure to Endocrine Disrupting Chemicals and Its Impact on Cardio-Metabolic-Renal Health

SSingh RD, Koshta K, Tiwari R, Khan H, Sharma V, Srivastava V. Developmental Exposure to Endocrine Disrupting Chemicals and Its Impact on Cardio-Metabolic-Renal Health. Front Toxicol. 2021 Jul 5;3:663372. doi: 10.3389/ftox.2021.663372. PMID: 35295127; PMCID: PMC8915840.

Article Link: <https://pubmed.ncbi.nlm.nih.gov/35295127/> - [Free Full Text](#)

“Endocrine disrupting chemicals (EDCs) include phenols, phthalates, parabens, flame retardants, heavy metals, pesticides, perfluorinated chemicals, UV filter components, triclosan, and organochlorines.”

“Cumulative exposure to mixtures of EDCs can lead to adverse effects on the health of the exposed individuals (Crews et al., 2003). Multiple studies, including the studies of the National Health and Nutrition Examination Survey (NHANES), have shown that about 75–97% of US and Asian adults have detectable levels of phthalates and phenols [bisphenol A (BPA) and polyfluoroalkyl chemicals] in their urine (Silva et al., 2004; Calafat et al., 2007, 2008; Vandenberg et al., 2010; Zhang et al., 2011; Husøy et al., 2019).”

“Epidemiological and experimental studies have also linked adult exposure to EDCs with abnormal male and female reproductive health, diabetes, obesity, cardiovascular and metabolic disorders, thyroid function, and hormone sensitive cancers (Howard and Lee, 2012; Bodin et al., 2015; Heindel et al., 2015, 2017).”

“Children are also vulnerable to EDCs (Calafat et al., 2017; Hendryx and Luo, 2018), making EDC exposure a major health concern for all age groups.”

“Chronic kidney disease is a growing health problem among children and adults. The incidence and the prevalence of chronic kidney disease (CKD) among children have been steadily increasing since the 1980s.... A number of traditional risk factors associated with CKD in children include hypertension, obesity, diabetes, and aberrant divalent mineral metabolism.... There is growing evidence that links exposure to EDCs with early progression to end-stage renal disease (ESRD) (Kataria et al., 2015)....”

“Early-life exposure to EDCs was associated with elevated levels of kidney toxicity markers such as albumin-to-creatinine ratio (ACR), estimated glomerular filtration rate (eGFR), and urinary protein-to-creatinine ratio (UPCR) in some human population studies (Li et al., 2012; Trasande et al., 2013a, 2014; Malits et al., 2018).”

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[Note: [Endocrine Disrupting Chemicals](#) (EDC’s) are [commonly used in perfumes and fragranced products](#) as preservatives or fragrance. [What are EDC’s](#) and how can they [affect us](#)?]

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