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Poster and Document are for reference and informational purposes only.

(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.

BABY/CHILDREN'S PRODUCTS

Wipes, Toys, Soaps, Lotions, Powders, Baby Oil, Baby Lotion, Diaper Pail Deodorizer/Scented Bags, Perfume/Cologne for Babies, Fragrance added to Diapers

Fragrance Chemicals on the Washington State List of Chemicals of High Concern to Children:
https://womensvoices.org/fragrance-ingredients/fragrance-chemicals-of-high-concern-to-children/

1. *An atlas of fragrance chemicals in children's products*

Ravichandran J, Karthikeyan BS, Jost J, Samal A. An atlas of fragrance chemicals in children's products. Sci Total Environ. 2022 Apr 20;818:151682. doi: 10.1016/j.scitotenv.2021.151682. Epub 2021 Nov 15. PMID: 34793786.
Article Link: https://pubmed.ncbi.nlm.nih.gov/34793786/

"We find that several **fragrance chemicals in children's products are potential carcinogens, endocrine disruptors, neurotoxicants, phytotoxins and skin sensitizers.**"

"Fragrance chemicals have been linked to the onset and exacerbation of **several allergic** and **non-allergic disease conditions** in humans."

"Exposure of children to hazardous chemicals via any route is a significant concern due to the potential **impact on the growth and development** during early childhood."

****FCCP Chemical Database:** FCCP A repository of Fragrance Chemicals in Children's Products
****FCCP Chemical Classification Data Compilation:** Graphical Abstract

2. *Newborn chemical exposure from over-the-counter skin care products*

Cetta F, Lambert GH, Ros SP. Newborn chemical exposure from over-the-counter skin care products. Clin Pediatr (Phila). 1991 May;30(5):286-9. doi: 10.1177/000992289103000504. PMID: 2044337.
Article Link: https://pubmed.ncbi.nlm.nih.gov/2044337/

"...many product ingredient labels list & fragrances. **The chemical composition and potential toxicity of these fragrances is not publicly available.**"
"In light of the relative **permeability of newborn skin**, the potential hazards of repetitive environmental chemical exposure from OTC skin care products need to be addressed."
"**This study documents the large number of chemicals, some of which are toxic, to which the average newborn is exposed during the first month of life**."

3. *Cosmetic Habits and Cosmetic Contact Dermatitis in Children*

Goossens, A. Cosmetic Habits and Cosmetic Contact Dermatitis in Children. *Curr Treat Options Allergy* 2, 228–234 (2015). https://doi.org/10.1007/s40521-015-0057-x

Article Link: https://link.springer.com/article/10.1007/s40521-015-0057-x - PDF

"Almost all cosmetic ingredients may be responsible for allergic **contact dermatitis**. Emulsifiers and other vehicle compounds, such as wool alcohols (lanolin), are possible allergenic culprits in cosmetics; however, **fragrance components** (fragrance mix, myroxylon pereirae, and colophonium), hair dye chemicals, and preservative agents are certainly the most important allergens"

"Although guidelines for the maximum concentration of fragrances (and preservatives) in cosmetics have been provided, it has been previously demonstrated that, for example, **cosmetic "toys" may contain much higher concentrations of fragrances**."

"**Allergic contact dermatitis from cosmetics in children and adolescents has recently become more frequently observed and recognized**. Fragrances, hair dyes, sunscreen agents, and preservative agents, particularly methylisothiazolinone, are the most important **allergens**."

"It remains an important task for the cosmetic industry to avoid the main allergens known from the literature and to formulate cosmetics intended to be used in this age group as safely as possible."

4. *Potential Allergens in Disposable Diaper Wipes, Topical Diaper Preparations, and Disposable Diapers: Under-recognized Etiology of Pediatric Perineal Dermatitis*

Yu J, Treat J, Chaney K, Brod B. Potential Allergens in Disposable Diaper Wipes, Topical Diaper Preparations, and Disposable Diapers: Under-recognized Etiology of Pediatric Perineal Dermatitis. Dermatitis. 2016 May-Jun;27(3):110-8. doi: 10.1097/DER.0000000000000177. PMID: 27172304.

Article Link: https://pubmed.ncbi.lnlm.nih.gov/27172304/

"**We found fragrances in 33.3% of diaper wipes and 43.6% of topical diaper preparations.**"

"Other potential **allergens** identified with high frequency include >-tocopherol, **fragrances**, propylene glycol, parabens, iodopropynyl butylcarbamate, and lanolin."

[Note: In the EU, 26 known fragrance allergens have been a labeling requirement since 2009, but as of 2022 the EU is planning to add 56 more fragrance allergens**]**

[Note: IN THE U.S. NEWS - On Dec. 29, 2022, the MOCRA - (Modernization of Cosmetic Regulation Act) was signed into law. In a few years, the U.S. should start listing fragrance allergens in cosmetics, but this Act may tie the hands of states' ability to make a law pertaining to disclosing the over 3,000 other potentially concerning fragrance ingredients (like California did).

To learn more, see what **Women's Voices for the Earth (WVE)** have figured out.

To read the Act, go to congress.gov link/PDF (page 1396).

What to know:

Which products qualify as 'cosmetics' and Who regulates what??

Items such as fragranced laundry products, air fresheners, carpet fragrance, fragrance in cleaning products or car / car wash fragrances are not considered cosmetics, therefore, it is safe to say that companies who sell these products will not be obligated to list the known fragrance allergens in their products.**]**

5. *Association of Prenatal Phthalate Exposure With Language Development in Early Childhood*

Bornehag CG, Lindh C, Reichenberg A, Wikström S, Unenge Hallerback M, Evans SF, Sathyanarayana S, Barrett ES, Nguyen RHN, Bush NR, Swan SH. Association of Prenatal Phthalate Exposure With Language Development in Early Childhood. JAMA Pediatr. 2018 Dec 1;172(12):1169-1176. doi: 10.1001/jamapediatrics.2018.3115. Erratum in: JAMA Pediatr. 2018 Dec 1;172(12):1205. PMID: 30383084; PMCID: PMC6583016.

Article Link: https://pubmed.ncbi.nlm.nih.gov/30383084/ - PDF

"Prenatal exposure to phthalates has been associated with **neurodevelopmental outcomes**… First-trimester phthalate exposure (particularly to DBP and possibly to BBzP) appears to be associated with **poorer language development in children** aged 2.5 to 3 years. In findings from this study, prenatal exposure to dibutyl phthalate and butyl benzyl phthalate was statistically significantly associated with **language delay** in children in both the SELMA study and TIDES."

[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".**]**

6. *Pediatric allergic contact dermatitis. Part I: Clinical features and common contact allergens in children*

Neale H, Garza-Mayers AC, Tam I, Yu J. Pediatric allergic contact dermatitis. Part I: Clinical features and common contact allergens in children. J Am Acad Dermatol. 2021 Feb;84(2):235-244. doi: 10.1016/j.jaad.2020.11.002. Epub 2020 Nov 17. PMID: 33217510.

Article Link: https://pubmed.ncbi.nlm.nih.gov/33217510/ - PDF

"Children can develop ACD (Allergic Contact Dermatitis) at any age…. Therefore, all children should be asked about the use of personal care products such as **shampoos, soaps, lotions, detergents, and topical medications.**…systemic contact dermatitis can occur through oral ingestion of contact allergens in food, such as carmine in red velvet cupcakes, nickel in oatmeal and cocoa, and **balsam of Peru (BoP)** in ketchup….Nickel, **fragrance mix (FM) I**, **BoP**, **propylene glycol**, CAPB, bacitracin, neomycin, cobalt, **formaldehyde (and its releasers)**, methylisothiazolinone (MI), and **lanolin** are top relevant allergens in the United States."

"Fragrances are ubiquitous environmental allergens, and although **there are potentially thousands of allergenic fragrance chemicals,** fragrance markers such as BoP, FM I, and FM II are most frequently used in patch testing…. Fragrances are often used in household products like candles and cleaning supplies. **Children may also be exposed to fragrances used by their care takers, such as perfumes, leading to cases of connubial ACD**."

"**Formaldehyde** is found in cosmetic and personal care products (**including baby products**), cleaning supplies, adhesives, sporting equipment, and paints. **One study showed that more than 25% of those with PPTs to formaldehyde were also sensitized to its releasers** such as quaternium-15, dimethyloldimethyl hydantoin, bronopol, diazolidinyl urea, and imidazolidinyl urea.

“Often, products such as **baby wipes may contain formaldehyde releasers** even though they may not be listed among the ingredients. **Formaldehyde (and releasers) contact allergy is more frequent in the United States compared to Europe, likely reflecting stricter regulation of product concentration and labeling in Europe.”**

[Note: Balsam of Peru is used in fragrance and is a known allergen. Like with all fragrance allergies, avoidance is suggested.**]**
[Note: Formaldehyde is a secondary pollutant from fragrance and fragranced products.
Also, a 2012 study, 21 out of 30 perfume samples were shown to release formaldehyde when tested but formaldehyde was not listed on any of the labels. Formaldehyde is a sensitizer and known allergen.**]**

[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.**]**

7. *Symptoms of mothers and infants related to total volatile organic compounds in household products*

Farrow A, Taylor H, Northstone K, Golding J. Symptoms of mothers and infants related to total volatile organic compounds in household products. Arch Environ Health. 2003 Oct;58(10):633-41. doi: 10.3200/AEOH.58.10.633-641. PMID: 15562635.
Article Link: https://pubmed.ncbi.nlm.nih.gov/15562635/

“Higher TVOC levels were associated with air freshener and aerosol use. **Infant diarrhea** and **earache** were statistically significantly associated with air freshener use, and **diarrhea** and **vomiting** were significantly associated with aerosol use.”

“Headache experienced by mothers 8 mo after birth was significantly associated with the use of air fresheners and aerosols; **maternal depression** was significantly associated with the use of air fresheners. The results of the study suggest a **link between the use of products that raise indoor levels of TVOCs and an increased risk of certain symptoms among infants and their mothers**.”
[Note: Fragranced products emit VOC’s that can contribute to higher particulate matter (PM) indoors and out.**]**

8. *Baby-Wipe Dermatitis: Preservative-Induced Hand Eczema in Parents and Persons Using Moist Towelettes*

Guin JD, Kincannon J, Church FL. Baby-wipe dermatitis: preservative-induced hand eczema in parents and persons using moist towelettes. Am J Contact Dermat. 2001 Dec;12(4):189-92. doi: 10.1053/ajcd.2001.28052. PMID: 11753890.
Article Link: https://pubmed.ncbi.nlm.nih.gov/11753890/

“Results: A total of 6 women and 3 men with **hand eczema** were found to be allergic to (preservatives found in) different brands of moist towelettes used in diaper hygiene. Many were **allergic to fragrance materials** as well.”

“Hand eczema in a grip-like pattern is good reason to inquire about baby wipes as a possible source, as most patients do not recognize that source even after undergoing patch tests.”

9. *Pressurized liquid extraction-gas chromatography-mass spectrometry analysis of fragrance allergens, musks, phthalates and preservatives in baby wipes*

Celeiro M, Lamas JP, Garcia-Jares C, Llompart M. Pressurized liquid extraction-gas chromatography-mass spectrometry analysis of fragrance allergens, musks, phthalates and preservatives in baby wipes. J Chromatogr A. 2015 Mar 6;1384:9-21. doi: 10.1016/j.chroma.2015.01.049. Epub 2015 Jan 22. PMID: 25662066.
Article Link: https://pubmed.ncbi.nlm.nih.gov/25662066/

"These products may contain complex **mixtures of harmful chemicals**…. Thirty-six of the target analytes were detected, highlighting the presence of **phenoxyethanol in all analyzed samples at high concentrations."**

"All the samples contained fragrance allergens in many cases at high levels (up to 2400 μg g−1) and three musks were detected in the samples."

"A pressurized liquid extraction followed by gas chromatography–mass spectrometry method has been developed for the determination of **fragrance allergens**, preservatives, **phthalates**, and **musks** in baby wipes and wet toilet paper intended for children. Twenty-five of the 65 target analytes are banned or subjected to restrictions according to European Legislation (EC No 1223/2009)."

[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: Most **Musk** in fragrances are created synthetically.**]**

10. *Rapid and green determination of 58 fragrance allergens in plush toys*

Wang Z, Zhang Q, Li H, Lv Q, Wang W, Bai H. Rapid and green determination of 58 fragrance allergens in plush toys. J Sep Sci. 2018 Feb;41(3):657-668. doi: 10.1002/jssc.201700556. Epub 2017 Dec 14. PMID: 29150895.
Article Link: https://pubmed.ncbi.nlm.nih.gov/29150895/

"**Toys are scented** to cover unpleasant odors or to enhance their attractiveness to consumers. However, **some fragrances are important sources of allergens**, which can **trigger respiratory illnesses (asthma and rhinitis), migraine headaches, neurotoxicity, endocrine-disrupting activities,** and other negative effects."

11. *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/

"Exposure to phthalates is known to affect the development and functions of the cardiovascular, reproductive and endocrine systems."
"This study found that most of sanitary pads or diapers surveyed contained both **VOCs** and **phthalates**."

[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".**]**

12. *Indoor Exposure to Selected Air Pollutants in the Home Environment*: A Systematic Review

Vardoulakis S, Giagloglou E, Steinle S, Davis A, Sleeuwenhoek A, Galea KS, Dixon K, Crawford JO. Indoor Exposure to Selected Air Pollutants in the Home Environment: A Systematic Review. Int J Environ Res Public Health. 2020 Dec 2;17(23):8972. doi: 10.3390/ijerph17238972. PMID: 33276576; PMCID: PMC7729884
Article Link: https://pubmed.ncbi.nlm.nih.gov/33276576/ - PDF

"There is increasing awareness that the quality of the **indoor environment** affects our health and well-being…. Identified indoor **$PM_{2.5}$** sources include smoking, cooking, heating, use of **incense, candles,** and **insecticides**, while **cleaning**, housework, presence of pets and movement of people were the main sources of coarse particles….Household characteristics and occupant activities play a large role in indoor exposure, particularly cigarette smoking for PM2.5, gas appliances for NO2, and **household products** for **VOCs** and PAHs."

"Typical **VOCs** found in the indoor environment include **benzene**, **toluene**, **ethylbenzene** and **xylenes (BTEX)** from fuel combustion and evaporation, and house renovations; benzene and **styrene** from cigarette smoking; alkanes from natural gas; 1,4-dichlorobenzene from moth repellents; **a-pinene** from wood-based building materials; and **limonene** from **fragranced** household **cleaning and laundry products**… Reported **VOC concentrations were generally higher indoors than outdoors**, including for **benzene**, particularly in colder seasons due to reduced ventilation and the use of oil and gas heaters."

"Indoor sources were dominant for most **VOCs** and particularly for **limonene, a-pinene, hexanal**, pentanal, **o-xylene**, and **n-dodecane**. Use of **artificial air freshener was significantly associated with total VOC (TVOC), benzene**, **toluene** and **ethylbenzene**."

"Indoor air quality (IAQ) in particular has an impact on multiple health outcomes, including **respiratory** and **cardiovascular illness, allergic symptoms, cancers,** and **premature mortality."**

[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.**]**

13. *A link between skin and airways regarding sensitivity to fragrance products?*

Elberling J, Linneberg A, Mosbech H, Dirksen A, Frølund L, Madsen F, Nielsen NH, Johansen JD. A link between skin and airways regarding sensitivity to fragrance products? Br J Dermatol. 2004 Dec;151(6):1197-203. doi: 10.1111/j.1365-2133.2004.06251.x. PMID: 15606515.

Article Link: https://pubmed.ncbi.nlm.nih.gov/15606515/

"**Contact sensitization to fragrances is one of the commonest causes of contact allergy in the general population**… as well as among patients with eczema. Exposure to volatile fragrances is commonplace and may be related to various **eye and airway symptoms**. Skin exposure to fragrances is known to cause **perfume contact allergy** and **eczema…."**

"Positive, independent and **significant associations were found between eye and airway symptoms** elicited by fragrance products and perfume contact allergy and hand eczema.… Individuals with perfume contact allergy and/or hand eczema, as opposed to those without, have more frequent and **more severe eye or airway symptoms after exposure to volatile fragrance product**s."

"We show consistent and significant associations between perfume contact allergy diagnosed by patch testing and symptoms elicited by fragrance products from the eyes and airways. The symptoms were mostly reported as elicited **within seconds and minutes after airborne exposure to fragrance products**."

14. *Characterization of odorants in inflatable aquatic toys and swimming learning devices-which substances are causative for the characteristic odor and potentially harmful?*

Wiedmer C, Velasco-Schön C, Buettner A. Characterization of odorants in inflatable aquatic toys and swimming learning devices-which substances are causative for the characteristic odor and potentially harmful? Anal Bioanal Chem. 2017 Jun;409(16):3905-3916. doi: 10.1007/s00216-017-0330-x. Epub 2017 Apr 12. PMID: 28401289.

Article Link: https://pubmed.ncbi.nlm.nih.gov/28401289/

"Toys can exhibit strong offensive smells that might also indicate the presence of other odorless hazardous chemicals in the affected product. Inflatable water toys such as beach balls or air mattresses are commonly known to be odor-active. Nevertheless, published data on the causative odorants and their origin are rare. … It is also interesting to note that not all inflatable polyvinyl chloride (PVC) products for children's use in water are termed as toys. The legal basis for this differentiation between toys and other products in Europe is the European Toy Safety Directive 2009/48/EC."

"**Phenol**, which was also found in all samples, is classified as category 2 **mutagen** (substances suspected of causing **genetic defects**) and as being **acutely toxic (Category 3)**."

"Cyclohexanone, which was found in three of the four investigated samples, is classified as **harmful if inhaled (acute toxicity Category 4)**. In view of this, it needs to be stated that the signals corresponding to isophorone and cyclohexanone were amongst the highest peaks in the respective chromatograms, indicating that these compounds were present in relatively high concentrations."

[Note: Phenol used in fragrance is mostly synthetic derived from benzene/petro. It is an EDC and declared as fragrance on the CSCP list and on the IFRA fragrance transparency list. Phenol is on the Washington State

List of Chemicals of High Concern to Children and Priority Pollutant List. **Cyclohexanone** is on the IFRA list, it smells like peppermint.**]**

15. *Resolving the chemical structures of off-odorants and potentially harmful substances in toys—example of children's swords*

Denk P, Velasco-Schön C, Buettner A. Resolving the chemical structures of off-odorants and potentially harmful substances in toys-example of children's swords. Anal Bioanal Chem. 2017 Sep;409(22):5249-5258. doi: 10.1007/s00216-017-0469-5. Epub 2017 Jul 11. PMID: 28695232.

Article Link: https://pubmed.ncbi.nlm.nih.gov/28695232/

"A total of 26 odor-active compounds, including **aromatic hydrocarbons** and **phenols**, were identified among numerous non-odorous volatile by-products. These substances also included polycyclic aromatic hydrocarbons, which were analyzed by GC-MS. Representative substances were naphthalene and 1,2-dihydronaphthalene that exhibited moldy, mothball-like odor impressions, and **phenol derivatives** with leather-like, phenolic, horse-stable-like smells…. This study clearly shows that the detection and identification of such odorous contaminants can provide key indications of potentially harmful yet unknown substances in everyday products such as toys."

[Note: Phenol used in fragrance is mostly synthetic derived from benzene/petro. It is an EDC and declared as fragrance on the CSCP list and on the IFRA fragrance transparency list. Phenol is on the Washington State List of Chemicals of High Concern to Children and Priority Pollutant List.**]**

16. *Chemicals of concern in plastic toys*

Aurisano N, Huang L, Milà I Canals L, Jolliet O, Fantke P. Chemicals of concern in plastic toys. Environ Int. 2021 Jan;146:106194. doi: 10.1016/j.envint.2020.106194. Epub 2020 Oct 22. PMID: 33115697.

Article Link: https://pubmed.ncbi.nlm.nih.gov/33115697/ - PDF

"Out of 126 CoCs (chemicals of concern), we found 31 plasticizers, 18 flame retardants and **8 fragrances**."
"The 27 substances identified in category I, correspond well to chemicals present in other prioritization lists. For example, widely regulated **phthalates** are also identified as CoCs in the present study. These phthalates include **DEHP, DINP, DBP, DiDP, di-(n-octyl)-phthalate** (DNOP, CAS: 117-84-0), and **benzyl butyl phthalate** (BBP, CAS: 85-68-7)."

"Finally, we found 37 substances that appear in our category IV, which contains substances that appear in other priority lists, but for which we were not able to quantify any risk. This includes the **allergenic fragrance d-Limonene** (CAS: 5989-27-5), which was detected in toys…"

[Note: 8 listed Fragrance chemicals of concern from Table 1: **Hexadecanoic Acid, Linalool, Acetophenone, Biphenyl, Diethyl Propanedioate, Propylbenzene, Methylparaben, Propylparaben]**

[Note: Styrene is "primarily a synthetic chemical**"** used in fragrance. It is on the CSPC list as 'parfum/fragrance' and also on the IFRA list.**]**

[Note: Phenol used in fragrance is mostly synthetic derived from benzene/petro. It is an EDC and declared as fragrance on the CSCP list and on the IFRA fragrance transparency list. Phenol is on the Washington State List of Chemicals of High Concern to Children and Priority Pollutant List.**]**

[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".**]**

17. *Exposures to Endocrine Disrupting Chemicals in Consumer Products - A Guide for Pediatricians*

Wong KH, Durrani TS. Exposures to Endocrine Disrupting Chemicals in Consumer Products-A Guide for Pediatricians. Curr Probl Pediatr Adolesc Health Care. 2017 May;47(5):107-118. doi: 10.1016/j.cppeds.2017.04.002. Epub 2017 May 17. PMID: 28526231.
Article Link: https://pubmed.ncbi.nlm.nih.gov/28526231/

"Infants can be exposed to endocrine disrupting chemicals via breast milk or infant formula."
"One study has found links between monoethyl phthalate concentrations in perinatal breast milk and changes in reproductive hormones in breastfed infants."

"One study found an association between exposure to infant care products (i.e., **lotion, powder, and shampoo**) and **increased urinary levels of phthalate metabolites**. Phthalates also are found in personal care products because they help to dissolve ingredients in the product and impart flexibility that, for example, makes nail polish less brittle. They are commonly found in personal care products such as nail polish, shampoo, hairspray, **fragrances**, and after shave lotion. Baby care products such as baby lotion, diaper cream, body wash, wet wipes, shampoo, and baby oils also have detectable levels of phthalates."

"Phthalates are non-covalently bonded to their parent materials and can readily leach into the environment. This property, combined with **widespread use in consumer products, accounts for widespread exposure** in the American population (phthalate metabolites are detected in urine samples of 89-98% of Americans sampled)."

"Avoiding Products with phthalates, parabens, triclosan, and **fragrances** have been proven to reduce urinary concentrations of phthalates and parabens… **Consumers should avoid products that have fragrance because they are likely to contain phthalates**."

18. *Development and Validation of the Prevention of Toxic Chemicals in the Environment for Children Tool: A Questionnaire for Examining the Community's Knowledge of and Preferences Toward Toxic Chemicals and Children's Brain Development*

Green R, Lanphear B, Phipps E, Goodman C, Joy J, Rihani S, Flora D and Till C (2022) Development and Validation of the Prevention of Toxic Chemicals in the Environment for Children Tool: A Questionnaire for Examining the Community's Knowledge of and Preferences Toward Toxic Chemicals and Children's Brain Development. Front. Public Health 10:863071. doi: 10.3389/fpubh.2022.863071
Article Link: https://www.frontiersin.org/articles/10.3389/fpubh.2022.863071/full - free full text

"Toxic chemicals are an insidious threat to children. **Toxic chemicals elevate the risk for neurodevelopmental disorders, including learning disabilities, attention deficit hyperactivity disorder (ADHD), and autism spectrum disorder (ASD)**. The developing brain is particularly vulnerable to **toxic chemicals, even at low doses** that might not have an adverse effect on adults. Therefore, early identification and recognition by the public of potential sources of exposure to toxic chemicals are crucial to protect children."

"One recent American study found that greater parental concern about toxic chemicals was associated with lower urinary concentrations of **phthalates** and **phenols** in children's urine."

[Note: Phenol used in fragrance is mostly synthetic derived from benzene/petro. It is an EDC and declared as fragrance on the CSCP list and on the IFRA fragrance transparency list. Phenol is on the Washington State List of Chemicals of High Concern to Children and Priority Pollutant List.**]**

[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".**]**

19. *Exposure to widespread environmental toxicants and children's cognitive development and behavioral problems*

Jurewicz, Joanna et al. "Exposure to widespread environmental toxicants and children's cognitive development and behavioral problems." International Journal of Occupational Medicine and Environmental Health, vol. 26, no. 2, 2013, pp. 185-204. doi:10.2478/s13382-013-0099-x.
Article link: https://pubmed.ncbi.nlm.nih.gov/23715930/ - PDF

"The results from the presented studies suggest that there are strong and rather consistent indications that the developing nervous system is particularly vulnerable to insult from low levels of exposure to widespread environmental contaminants such as: **phthalates**, bisphenol A, brominated flame retardants, polycyclic aromatic hydrocarbons, gas cooking."

[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".**]**

20. *Neurotoxicity of Ortho-Phthalates: Recommendations for Critical Policy Reforms to Protect Brain Development in Children*

Stephanie M. Engel, Heather B. Patisaul, Charlotte Brody, Russ Hauser, Ami R. Zota, Deborah H. Bennet, Maureen Swanson, and Robin M. Whyatt, 2021: Neurotoxicity of Ortho-Phthalates: Recommendations for Critical Policy Reforms to Protect Brain Development in Children American Journal of Public Health 111, 687_695, https://doi.org/10.2105/AJPH. 2020.306014
Article link: https://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2020.306014?role=tab - PDF

"There are robust data from longitudinal birth cohort studies conducted over the last decade that have shown associations between prenatal exposures to ortho-phthalates and **attention-deficit hyperactivity disorder (ADHD)**, other **behavioral problems**, **adverse cognitive development** including **lower IQ**, **poorer**

psychomotor development, and **impaired social communication**. This growing body of evidence, along with the known **adverse effects on male reproductive tract development** of ortho-phthalates, calls for immediate action."

"Phthalates including **DEP** and DBPs are commonly used in cosmetics and other personal care products, and are sometimes used as excipients in **medications** and **supplements** (see the box on page 689). For example, DEP and DBPs are used in a wide range of personal care products including **nail polish, lotions, fragrances**, and **hair-styling products.**… **Phthalates are readily transferred from mother to fetus during pregnancy**."

"**There is no longer any basis for the agency to conclude that there is "reasonable certainty of no harm" from these uses… All of the phthalates that have been associated with adverse child neurodevelopment, discussed previously, are currently approved by FDA for food contact use."**

"Authority to regulate phthalates in cosmetics (which are defined broadly to include many personal care products) also falls under **FDA jurisdiction**. However, **the agency's authority is much less comprehensive and health protective than its authority to ensure the safety of food or drugs. This needs to be rectified by congressional action."**

"Substantial evidence links exposure to phthalates with increased risks for **child learning, attention**, and **behavioral problems**. We therefore recommend that phthalates be eliminated from products that may lead to exposure of women of reproductive age, pregnant women, infants, and children."

[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".**]**

21. *Endocrine disruptor chemicals as obesogen and diabetogen: Clinical and mechanistic evidence*

Kurşunoğlu NE, Sarer Yurekli BP. Endocrine disruptor chemicals as obesogen and diabetogen: Clinical and mechanistic evidence. World J Clin Cases. 2022 Nov 6;10(31):11226-11239. doi: 10.12998/wjcc.v10.i31.11226. PMID: 36387809; PMCID: PMC9649566.
Article Link: https://pubmed.ncbi.nlm.nih.gov/36387809/

"Besides the **obesogenic effect**, **EDCs** can cause **type 2 diabetes mellitus** through alteration in ß cell function and morphology and **insulin resistance**."

Medical devices, including parenteral feeding tubes, **personal care products** such as nail polish and **perfume,** food packaging, and toys contain various **phthalates**[49]. Unfortunately, phthalates are poorly bio-degradable and highly bioaccumulative in the food chain[50].

"High phthalate exposure has been linked with increased threat of obesity and **infertility**, **increased body mass index** (BMI) and **waist circumference**, **insulin resistance**, and a **change in thyroid hormones**[49,52]".

"In this context, **perinatal exposure** can be important as far as the permanent and transgenerational effects are concerned. **EDCs promote adipogenesis leading to fat accumulation**, which causes **alteration in lipid metabolism and satiety as obesogens**. EDCs have shown the potential to induce adipose tissue dysfunction not only in white adipocytes but in brown and beige fat as well."

[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?**]**

[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".**]**

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

Singh 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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https://www.fragrancefreecoalitionusa.com/