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Abstract

This review of the aggregated data to date finds the overwhelming weight of the evidence supports the contention that many laundry and household cleaning products add significant elevated risk to humans in the domains of reproductive/fertility risk; respiratory/pulmonary (asthma, cardiopulmonary disease) risk; neurological/cognitive (ADHD, autism) risk; metabolic (diabetes, obesity) risk; and oncogenic (cancer) risk. We focus discussion on laundry products, the subject of much research and regulatory scrutiny. We also provide a summary of existing and emerging legislation, national and global, to regulate and thereby limit the potential multifaceted harms of these products (phthalates, plasticizers, bisphenols, PBDEs, PAHs, phenols, and PFAS substances). Concerns have been sufficiently serious and well evidenced that most of these toxic chemicals have been banned in the EU and over 40 other nations, as well as in California, with pending prohibitions in over a dozen other states (including CT, NY, NJ, MA), and with retailers like Home Depot, Lowe's, Walmart, Target, Apple, Hewlett Packard and 100+ others pledging for their elimination from cosmetics, personal care and household products in near future.

Overview of the Dangers: Our review of the aggregated data to date finds the weight of the evidence demonstrating that among household, personal care, and cosmetic products, dryer sheets in particular along with fragranced laundry products, add significant risk to humans in various domains:

- **Reproductive/fertility:** this stems largely from endocrine disrupting chemical (EDC) components like phthalates, bisphenols, and parabens that can dysregulate estrogen pathways, and can also serve as “pubertal influencers”, advancing to younger years the age of puberty.
- **Respiratory/pulmonary:** in particular asthma and cardiopulmonary diseases.
- **Neurological/cognitive:** the components can exert neurotoxic activity, with adverse impact on ADHD and autism, among others.
- **Metabolic disease:** especially diabetes and obesity, where the components can be said to be obesogenic.
- **Oncogenic (cancer):** increasing risk of endocrine-related cancers, especially breast cancer and prostate cancer, but also lung, thyroid and hepatocellular cancer.

Numerous extensive investigations and aggregated scientific safety and toxicity studies have concluded that common products used in the laundry process contain complex mixtures of *endocrine-disrupting compounds (EDCs)* and asthma-related compounds [Dodson 2012]. EDCs are agents that can alter hormonal signaling, mimicking estrogen, and have potential effects on developing reproductive and nervous systems, metabolism, and cancer, and can also be associated with adverse developmental effects and in humans [Colborn 1993] [Parlett 2013] [Jurewicz 2011] [Chen 2014] [Ventrice 2014].

Phthalates are used in fragrances, home and personal care products, and laundry products, and because they are semi-volatile, they are found in indoor air and dust, with exposure to humans via inhalation, ingestion, and skin absorption. In addition, note that phthalates – like DEP (diethyl phthalate) - are often added to fragrance to make the scent linger, so are extremely common in all scented products including dryer sheets and softeners. These phthalates (Phth), known endocrine-disruptors, may play a role in breast carcinogenesis. Low-molecular-weight phthalates (LMWPhth) are commonly found in personal care products while high MWPhth (HMWPhth) are used primarily as plasticizers. The weight of the scientific evidence finds that phthalates are associated with asthma and wheezing in children [Bornehag 2010] [Kumar 1995] [Parks 2020], among other harms (see below), as are other common laundry agents. The specific epidemiology of one of these, asthma-related QACs (quaternary ammonium compounds, aka “quats”) has been reviewed extensively by the Mount Sinai Selikoff Centers for Occupational Health (SSCOH) in collaboration with the Bellevue/NYU Occupational & Environmental Medicine Clinic (BNOEMC) [SSCOH/BNOEMC 2016].

This has led to numerous calls by environmental scientists for the total prohibition from all consumer products of such agents. One of the latest is that of Dr. Russ Hauser, Professor of Reproductive Physiology and Professor of Environmental and Occupational Epidemiology at Harvard T.H. Chan School of Public Health recent issuance, along with experts in toxic chemicals and neurodevelopment who are members of Project TENDR (Targeting Environmental Neuro-Development Risks) [<http://projecttendr.com/>], of a National Call to Action (“Why phthalates should be restricted or banned from consumer products” [Hauser 2021]), supported by

- the National Institute of Environmental Health Sciences (NIEHS) National Toxicology Program (NTP),
- the Center for Environmental Research and Children’s Health (CERCH),
- the American Academy of Pediatrics Environmental Health Council,
- the Environmental Defense Fund (EDF),
- the Collaborative on Health and the Environment (CHE),
- the Commission on Environmental Health National Medical Association,
- the Science and Environmental Health Network,
- the Natural Resources Defense Council (NRDC),
- the Children’s Environmental Health Network,

among dozens of others across the nation. (See our summary of legislation in the Appendix of this document). Collectively, on the neurological front alone, there is overwhelming scientific evidence linking these toxic environmental chemicals to neurodevelopmental disorders that can impair brain development and increase risks for learning, attention, and behavioral disorders in childhood, including autism spectrum disorder, attention deficits, hyperactivity, intellectual disability and learning disorders [Engel 2021].

What's Lurking in the Laundry: The labeling terms “natural,” “nontoxic,” and “green” are unregulated and require no standardized ingredient information. Indeed, in a recent study [Steinemann 2011] found that the VOC composition of “green”-labeled fragranced products was not significantly different from that of other fragranced products with regard to number of hazardous chemicals as defined under U.S. federal laws [Potera 2011]. Testing by the Environmental Working Group (EWG) has also revealed that 75% of the fragrances contain phthalates, linked to diabetes, obesity and hormone (endocrine) disruption which affects both development and fertility, and the Mt. Sinai Children’s Environmental Health Center (CEHC) has linked exposure to synthetic fragrance that including endocrine disruptors (as with dryer sheets) in first and third prenatal exposure to ADHD and autism [Landrigan 2012] [Mount Sinai 2012] [Bagasra 2013]. Recognizing the household dust is a vast repository of consumer product chemicals and pollutants, researchers at UC Davis conducted a large study of these potentially hazardous agents in California house dust [Shin 2020], including semivolatile organic compounds (SVOCs) for which household dust is a reservoir, finding that in the 119 newly detected compounds, 13 had endocrine-disrupting potential, while another 7 had neurotoxic potential. These included phthalates, plasticizers, bisphenols, PBDEs (polybrominated diphenyl ethers), OP-FRs (organophosphate flame retardants); PAHs (polycyclic aromatic hydrocarbons), phenols, and PFAS (per- and polyfluoroalkyl substances). And although products may be labeled as ‘fragrance-free’ they may also contain fragrance compounds when used preservatives or fixatives.

In a seminal study of effective VOC-reduction strategies [Goodman 2019], researchers conducted a comprehensive study of emissions from dryer vents during use of fragranced versus fragrance-free laundry products, showing that the simple strategy of changing from fragranced to fragrance-free products can be an effective approach to reducing ambient air pollution and potential health risks. This, in households using fragranced laundry detergent, the highest concentration of d-limonene (a common fragrance agent found in laundry products like dryer sheets and detergents) from a dryer vent was 118 µg/m³, compared to just 0.26 µg/m³ in households using only fragrance-free laundry products, and after households using fragranced detergent switched to using fragrance-free detergent, the concentrations of d-limonene in dryer vent emissions were reduced by up to 99.7%. D-limonene is associated with multiple adverse effects, including breathing difficulties manifested in wheezing or coughing [NICNAS 2002], and can react with ozone to generate hazardous air pollutants which include formaldehyde, acetaldehyde, and ultrafine particles, known respiratory irritants and carcinogens [Nazaroff 2004].

In the U.S. 12.5% of adults reported adverse health effects (asthma attacks, migraine headaches) from the fragrance of laundry products emitting from a dryer vent, with 28.9% of adults with diagnosed asthma or an asthma-like condition reporting adverse health effects from these dryer-vent

fragrances [Steinemann 2018; 2018c]. It has been noted that the pathologies triggered by endocrine disrupting compounds (EDCs) include neuropathies like depression and autism), malignant disease like breast cancer and prostate cancer, endocrinopathies like gynacomastia, organ damage like hepatotoxicity, among many others [Patel 2017].

The Cancer Connection: In addition, there are "secondary hazard" effects: limonene and other volatile aromatic terpenes (pine, citrus oils, essential oils) react with ozone present in the surrounding air to generate secondary pollutants that including *formaldehyde* (probable human carcinogen), *acetaldehyde* (probable human carcinogen), *acetone* (respiratory / pulmonary irritant), and ultra-fine particles known as *PM0.1* (these are classified by the International Agency for Research on Cancer (IARC) and the US National Toxicology Program (NTP) as Group 1 human carcinogens, associated with lung cancer and as well as cardiopulmonary disease) [ACS]). Another class of agents commonly used in dryer sheets is *nonylphenol ethoxylates* (or *NPEs*), a mix of petrochemical cleaning agents also used in many laundry detergents as surfactants (lowering the surface tension of water to allow for a deeper clean each time they are used). And it is known that certain agents like *dichlorobenzene* can not only induce irritation of the skin, throat and eyes, but have chronic (long-term) effects on the liver, skin, and central nervous system (CNS), which has led the EPA to warning of it being suspected to cause human cancer, therefore classifying it as a *possible human carcinogen* [EPA 1999.]. Despite being completely banned in Canada and the EU, these agents are still found in laundry products in the U.S.

The Breast Cancer Connection: Most alarmingly, new human clinical evidence from the Multiethnic Cohort Study of 798 women just presented this June (2020) shows that phthalate exposure – and also parabens [BCPP Parabens] and other EDCs – is associated with increased risk of invasive breast cancer [Wu 2020], and may be higher risk still in subgroups of women with greater genetic susceptibility (such as women with BRCA-mutations), as shown in a just published (August, 2020) systematic review of 56 studies [Zeinomar 2020], cross-validating other critical studies [Terry 2019] [Ahern 2019]. A widely used class of phthalates, known as high molecular weight phthalates (HMWPhth) are used primarily as plasticizers found in a broad swatch of products from personal care to laundry products including dryer sheets, but in the notoriously underregulated U.S. markets, producers are not required by the FDA to list all ingredients in a product, only so-called “active ingredients”, and numerous individual chemicals in cosmetics like phthalates in fragrances are not required to be labeled, and so represent a hidden danger to the consumer [BCPP Phthalates]. This is in contrast to the EU where full-disclosure is required, and endocrine disruptors like phthalates and parabens have already been prohibited since 2005.

We also have several epidemiological studies linking endocrine disrupting compound (EDC) exposure with breast cancer risk, and still more importantly, with poor prognosis, which include the case-control study finding increased risk of breast cancer in North Mexico states among women exposed to diethyl phthalate [Lopez-Carrillo 2010], in agreement with the reviews from The Silent Spring Institute [Rodgers 2018], and the “Coimbra” Review [Encarnação 2019]. This wide spectrum and penetration of adverse effects of endocrine disrupting compound (EDC) was acknowledged by as early as The Endocrine Society in 2009 in their Scientific Statement on EDCs addressing the concerns to public health based on evidence of the effects of EDCs on male [Radke 2018] and female

reproduction, breast development, prostate and breast cancer, neuroendocrinology, thyroid, metabolism and obesity, and cardiovascular endocrinology [Diamanti-Kandarakis 2009]. In addition, EDCs can function as *pubertal influencers*, accelerating the processing of maturation of secondary sexual characteristics [Lucaccioni 2020], with recent studies accumulating evidence of exposure to EDCs during puberty predisposing to breast cancer later in life, and affecting a woman's reproductive potential and ovarian reserve, and influence outcome in assisted reproductive technology (ART), while elevating risk of the development of breast cancer at any age [Karwacka 2019] [Yilmaz 2020] [Giulivo 2017] [Morgan 2017].

Breast Cancer Prevention Partners (BCPP) released a landmark report in 2018 — *Right to Know: Exposing Toxic Fragrance Chemicals in Beauty, Personal Care and Cleaning Products* [BCPP Right to Know]. The report exposes the presence of harmful fragrance chemicals linked to cancer, hormone disruption, reproductive harm, and respiratory toxicity, not appearing on the label, especially unregulated toxic fragrance chemicals, all tested by BCPP using state-of-the-art laboratory testing via two-dimensional gas chromatography (GCxGC) Time-of-Flight (TOF) analysis. Fragrance chemicals made up three-quarters of the toxic chemicals in the beauty, personal care and cleaning / household products tested, with one in four of the total 338 fragrance chemicals detected linked to serious chronic health effects, as documented in their *Red List of Chemicals of Concern* as part of their Campaign for Safe Cosmetics [BCPP Red List]. The list included 102 chemicals found in personal care products that pose serious chronic health concerns including cancer, hormone disruption, and reproductive and developmental harm, and also now includes chemicals used in cleaning products and in fragrance (including dryer sheet products like Bounce whose Dryer Sheets have received an “F” rating from the Environmental Working Group (EWG, and whose improved Bounce Dryer Sheets, Free & Gentle, have fared only marginally better, with a “D” rating), all cross-confirmed by authoritative scientific bodies.

Finally, there are subtle metabolic and cognitive effects that are of especial concern:

Metabolic Effects: A recent review of the evidence has found an "obesogenic" impact from EDCs (including bisphenols, phthalates, biphenyls, and parabens, all common in laundry products including dryer sheets and laundry softeners), in that early life exposure to EDCs may impose an increased risk of obesity in later life [Yang 2018] [Mallhi 2011] and the effect of such exposure has further been found to correlate with increased body weight and/or body mass index during all life stages [Legeay 2017] [Liu 2019] [Liu 2017].

Cognitive Effects: Beyond these adverse effects, more evidence has accumulated than was previously identified, and critically reviewed and distilled this year (2020), for cognitive deficits and attention-deficit disorder in children following prenatal exposure to bisphenols [Kahn 2020].

Appendix: Legislation, Regulation and Voluntary Restrictions

Based on the robust aggregated evidence of multiple harms, including the fact that in California, 1.6 tons of volatile organic compounds or VOCs are emitted daily from fragranced cosmetics and personal care products alone [BCPP Legislation 2020], vastly more if we add cleaning and laundry products, California now bans 24 endocrine disrupting compounds including phthalates and parabens linked to breast cancer, as of the signing into law by Gov. Gavin Newsom of the landmark Toxic-Free Cosmetics Act (TFCA), Assembly Bill 2762, as of September 30th of this year (2020), joining the European Union and over 40 other nations (including Australia, Canada, Japan, Mexico and the United Kingdom among others), in protecting against these widespread but hidden toxic compounds [California TFCA 2020]. SB312 also closes an abused federal labeling loophole allowing companies to claim trade secret protection for chemicals used to impart fragrance or flavor. The banned chemicals are:

- Dibutyl phthalate (endocrine disruptor linked to breast cancer)
- Diethylhexyl phthalate (endocrine disruptor linked to breast cancer)
- Formaldehyde (a known carcinogen)
- Isobutylparaben (endocrine disruptor linked to breast cancer)
- Isopropylparaben (endocrine disruptor linked to breast cancer)
- Long chain PFAS chemicals (endocrine disruptors linked to cancer and immune system suppression)
- Methylene glycol (a type of formaldehyde)
- Mercury and related compounds (known neurotoxins)
- Paraformaldehyde (a known carcinogen)
- 2 types of Phenylenediamine (damage DNA and linked to cancers)
- Quaternium-15 (which releases formaldehyde)

Besides California that has already legislated its ban through the passage in law of the Toxic-Free Cosmetics Act (TFCA), the following states to follow similarly:

States Also Considering Banning of Toxic Personal Care and Cleaning Products:

Connecticut
Hawaii
Illinois
Maryland
Massachusetts
New Jersey
New York
Rhode Island
Vermont
West Virginia

with other joining in near future. And a move to national regulations is already underway, with several proposals currently pending in Congress (one being H.R. 5279 Amendment: Cosmetic Safety Enhancement Act of 2020). All phthalates are classified as dangerous substances by the European

Union's REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) regulation. A landmark advance is Governor Cuomo's signing into law a bill (NYS Bill No. 4389B/A 6295A) that bans more than trace amounts of the toxin and carcinogen 1,4-dioxane – the EPA has classified it as a Group B2, probable human carcinogen – widespread in laundry products, especially detergents, but also in cosmetic products and personal care products, and in 97% of hair relaxers, 57% of baby soaps and children's bubble bath and body washes, with the highest levels in products that include Victoria Secret's shower gels, Tide Original laundry detergent, Dreft Stage 1/Newborn baby laundry detergent, and Ivory Snow 2X Ultra Detergent. Given the extensive use of dioxane across the Tide product line, Tide is reducing amounts after successful lawsuits against it from consumer environmental groups. The ban takes effect this January 1, 2022, with increasingly stringent requirements over a two-year period, and California and many other states will shortly follow suit.

In addition, many environmentally conscious firms have taken the initiative, including:

- Home providers Home Depot, Lowe's, and IKEA
- Computer giants Apple and Hewlett Packard,
- Ahold Delhaize (grocery chain owning Food Lion, Giant Food, Giant/Martin's, Hannaford, and Stop & Shop) which has banned phthalates from their branded products in all grocery, baby food and infant formula, and in all formulated laundry products, as well as personal care, cosmetic, and baby products,
- Health and Home Products retailers CVS, Rite-Aid, Walmart, Target, Walgreens, Amazon, and Costco who have reduced the use of phthalates in beauty and personal care products, as well as household products, with the ultimate goal of complete elimination

among a very rapidly growing list of others (Whole Foods, Sephora, Annie's, Mohawk, Tarkett, SC Johnson, Steelcase, Kaiser Permanente, . . .); for more, consult *Who's Minding the Store? – A Report Card on Retailer Actions to Eliminate Toxic Chemicals*, from by the Mind the Store campaign, a program of Toxic-Free Future, which issues a Grade Report for the top retailers.

References

- [ACS] American Cancer Society (ACS). Known and Probable Human Carcinogens. <https://www.cancer.org/cancer/cancer-causes/general-info/known-and-probable-human-carcinogens.html>
- [Ahern 2019] Ahern TP, Broe A, Lash TL, et al. Phthalate Exposure and Breast Cancer Incidence: A Danish Nationwide Cohort Study. *J Clin Oncol* 2019 ;17.
- [Bagasra 2013] Bagasra O, Golkar Z, Garcia M, Rice LN, Pace DG. Role of perfumes in pathogenesis of autism. *Med Hypotheses*. 2013 Jun; 80(6):795-803.
- [BCPP 2020] California First State To Ban 24 Toxic Chemicals in Personal Care Products and Cosmetics. Breast Cancer Prevention Partners. Sept. 30, 2020. Available at: <https://www.bcpp.org/resource/california-first-state-to-ban-24-toxic-chemicals-in-personal-care-products-and-cosmetics/>.
- [BCPP Legislation 2020] Cars Aren't the Only Thing Polluting Our Air. Breast Cancer Prevention Partners. Sept. 30, 2020. Available at: <https://www.bcpp.org/resource/cars-arent-the-only-thing-polluting-our-air/>.
- [BCPP Phthalates] Phthalates. Breast Cancer Prevention Partners. Available at: <https://www.bcpp.org/resource/phthalates/>
- [BCPP Red List] Breast Cancer Prevention Partners (BCPP): Avoiding the Use of Chemicals with Adverse Health Effects in Cosmetics, Cleaning Products and Fragrance. Available at: <https://www.bcpp.org/resource/red-list/>
- [BCPP Right to Know] Breast Cancer Prevention Partners (BCPP). Right to Know: Exposing Toxic Fragrance Chemicals in Beauty, Personal Care, and Cleaning Products. Breast Cancer Prevention Partners. 2018. Available at: <https://www.bcpp.org/resources/right-to-know-exposing-toxic-fragrance-chemicals-report/>
- [Bornehag 2010] Bornehag CG, Nanberg E. Phthalate exposure and asthma in children. *Int J Androl*. 2010;33:333–345.
- [California TFCA 2020] California First State To Ban 24 Toxic Chemicals in Personal Care Products and Cosmetics. Breast Cancer Prevention Partners. Sept. 30, 2020. Available at: <https://www.bcpp.org/resource/california-first-state-to-ban-24-toxic-chemicals-in-personal-care-products-and-cosmetics/>.
- [Chen 2014] Chen X, Xu S, Tan T, et al. Toxicity and estrogenic endocrine disrupting activity of phthalates and their mixtures. *Intern J Environmental Res Public Health* 2014;11(3):3156-3168.
- [Colborn 1993] Colborn T, vom Saal FS, Soto A. Developmental effects of endocrine-disrupting chemicals in wildlife and humans. *Environ Health Perspect*. 1993;101:378–385.
- [Dabre 2018] Darbre PD. Human health implications of personal care products: Breast cancer and other breast-related diseases. In Reference module in earth systems and environmental sciences. Available at: <https://doi.org/10.1016/B978-0-12-409548-9.10997-2>.
- [Diamanti-Kandarakis 2009] Diamanti-Kandarakis E, Bourguignon JP, Giudice LC. Endocrine-disrupting chemicals: an endocrine society scientific statement. *Endocr Rev* 2009; 30: 293–342.
- [Dodson 2012] Dodson RE, Nishioka M, Standley LJ, Perovich LJ, Brody JG, Rudel RA. Endocrine disruptors and asthma-associated chemicals in consumer products. *Environ Health Perspect*. 2012 Jul; 120(7):935-43.
- [Encarnaç o 2019] Encarnaç o T, Pais AA, Campos MG, Burrows HD. Endocrine disrupting chemicals: Impact on human health, wildlife and the environment. *Sci Prog*. 2019 03; 102(1):3-42.

[Engel 2021] Engel SM, Patisaul HB, Brody C, et al. Neurotoxicity of Ortho-Phthalates: Recommendations for Critical Policy Reforms to Protect Brain Development in Children. *Am J Public Health*. 2021 04; 111(4):687-695.

[EWG 2013] Environmental Working Group (EWG). Dirty Dozen Endocrine Disruptors – 12 Hormone-Altering Chemicals and How to Avoid Them. 2013. Available at: <https://www.ewg.org/research/dirty-dozen-list-endocrine-disruptors>

[EPA 1999] U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS) on 1,4-Dichlorobenzene National Center for Environmental Assessment, Office of Research and Development, Washington, DC 1999.

[Giulivo 2016] Giulivo M, Lopez de Alda M, Capri E, Barcelo D. Human exposure to endocrine disrupting compounds: their role in reproductive systems, metabolic syndrome and breast cancer. A review. *Environ Res*. 2016;151:251–64.

[Goodman 2019] Goodman NB, Wheeler AJ, Paevere PJ, et al. Emissions from dryer vents during use of fragranced and fragrance-free laundry products. *Air Qual Atmos Health* 2019; 12, 289–295.

[Hauser 2021] Hauser, R. “Why phthalates should be restricted or banned from consumer products”. Harvard T.H. Chan School of Public Health. News. March 10, 2021. At: <https://www.hsph.harvard.edu/news/features/the-big-3-why-phthalates-should-be-restricted-or-banned-from-consumer-products/>.

[Jurewicz 2011] Jurewicz J, Hanke W. Exposure to phthalates: reproductive outcome and children health. A review of epidemiological studies. *Intern J Occupat Med and Environmental Health* 2013; 24(2):115-141.

[Kahn 2020] Kahn LG, Philippat C, Nakayama SF, Slama R, Trasande L. Endocrine-disrupting chemicals: implications for human health. *Lancet Diabetes Endocrinol*. 2020 08; 8(8):703-718.

[Karwacka 2019] Karwacka A, Zamkowska D, Radwan M, Jurewicz J. Exposure to modern, widespread environmental endocrine disrupting chemicals and their effect on the reproductive potential of women: an overview of current epidemiological evidence. *Hum Fertil (Camb)* 2019 Apr; 22(1):2-25.]

[Kumar 1995] Kumar P, Caradonna-Graham VM, Gupta S, Cai X, Rao PN, Thompson J. Inhalation challenge effects of perfume scent strips in patients with asthma. *Ann Allergy Asthma Immunol*. 1995;75:429–433.

[Legeay 2017] Legeay S, Faure S. Is bisphenol A an environmental obesogen? *Fundam Clin Pharmacol*. 2017 Dec; 31(6):594-609.

[Landrigan 2012] Landrigan P, Lambertini L, Birnbaum L. A Research Strategy to Discover the Environmental Causes of Autism and Neurodevelopmental Disabilities. *Environmental Health Perspectives*, 2012.

[Liu 2017] Liu B, Lehmler HJ, et al. Bisphenol A substitutes and obesity in US adults: analysis of a population-based, cross-sectional study. *Lancet Planet Health*. 2017 Jun; 1(3):e114-e122.

[Liu 2019] Liu B, Lehmler HJ, Sun Y, et al. Association of Bisphenol A and Its Substitutes, Bisphenol F and Bisphenol S, with Obesity in United States Children and Adolescents. *Diabetes Metab J*. 2019 02; 43(1):59-75.

[Lopez-Carrillo 2010] Lopez-Carrillo L, Hernandez-Ramirez RU, Calafat AM, et al. Exposure to phthalates and breast cancer risk in northern Mexico. *Environ. Health Perspect* 2010; 118:539–544, 10.1289/ehp.0901091.

- [Lucaccioni 2020]** Lucaccioni L, Trevisani V, Marrozzini L, et al. Endocrine-Disrupting Chemicals and Their Effects during Female Puberty: A Review of Current Evidence. *Int J Mol Sci.* 2020 Mar 18; 21(6).
- [Mallhi 2011]** Mallhi T.H., Khokhar A., Khan Y.H., Alotaibi N.H., Khan A. Endocrine Disrupting Chemicals Induced Childhood Obesity. In: Akash M., Rehman K., Hashmi M. (eds) *Endocrine Disrupting Chemicals-induced Metabolic Disorders and Treatment Strategies. Emerging Contaminants and Associated Treatment Technologies.* 2011. Springer, Cham.
- [Morgan 2017]** Morgan M, Deoraj A, Felty Q, Roy D. Environmental estrogen-like endocrine disrupting chemicals and breast cancer. *Mol Cell Endocrinol.* 2017;457:89–102.
- [Mount Sinai 2012]** Mount Sinai Medical Center. "Top ten toxic chemicals suspected to cause autism and learning disabilities." *ScienceDaily.* ScienceDaily, 25 April 2012.
- [Nazaroff 2004]** Nazaroff WW, Weschler CJ. Cleaning products and air fresheners: exposure to primary and secondary air pollutants. *Atmos Environ* 2004; 38(18):2841–2865.
- [NICMAS 2002]** NICNAS. National industrial chemicals notification and assessment scheme. Limonene priority existing chemical assessment report number 22. Commonwealth of Australia 2002. Available at: <https://www.industrialchemicals.gov.au/sites/default/files/PEC22-Limonene.pdf>.
- [Parks 2020]** Parks J, McCandless L, Dharma C, et al. Association of use of cleaning products with respiratory health in a Canadian birth cohort. *CMAJ.* 2020 Feb 18;192(7):E154-E161.
- [Parlett 2013]** Parlett LE, Calafat AM, Swan SH. Women's exposure to phthalates in relation to use of personal care products. *Journal of Exposure Science and Environmental Epidemiology* 2013; 23(2), 197-206.
- [Patel 2017]** Patel S. Fragrance compounds: The wolves in sheep's clothings. *Med Hypotheses.* 2017 May; 102:106-111.
- [Potera 2011]** Potera C. Scented products emit a bouquet of VOCs. *Environ Health Perspect* 2011 119 :A16, 10.1289/ehp.119-a16.
- [Radke 2018]** Radke EG, Braun JM, Meeker JD, Cooper GS. Phthalate exposure and male reproductive outcomes: A systematic review of the human epidemiological evidence. *Environment International* 2018;121, 764-793.
- [Rodgers 2018]** Rodgers, KM, Udesky, JO, Rudel, RA. Environmental chemicals and breast cancer: an updated review of epidemiological literature informed by biological mechanisms. *Environ Res* 2018; 160: 152–182.
- [SSCOH/BNOEMC 2016]** Mount Sinai Selikoff Centers for Occupational Health. Bellevue/NYU Occupational & Environmental Medicine Clinic. Quaternary Ammonium Compounds in Cleaning Products Health & Safety Information for Health Professionals. 2016. Available at: https://med.nyu.edu/pophealth/sites/default/files/pophealth/QACs%20Info%20for%20Physicians_18.pdf
- [Shin 2020]** Shin H-M, Moschet C, Young TM, Bennett DH. Measured concentrations of consumer product chemicals in California house dust: Implications for sources, exposure, and toxicity potential. *Indoor Air.* 2020; 30: 60– 75.
- [Steinemann 2011]** Steinemann AC, MacGregor IC, Gordon SM, Gallagher LG, Davis AL, Ribeiro DS, et al. Fragranced consumer products: chemicals emitted, ingredients unlisted. *Environ Impact Assess Rev.* 2011;31(3):328–333.

- [Steinemann 2013]** Steinemann AC, Gallagher LG, Davis AL, MacGregor IC. Chemical emissions from residential dryer vents during use of fragranced laundry products. *Air Qual Atmos Health* 2013; 6(1):151–156.
- [Steinemann 2015]** Steinemann A. Volatile emissions from common consumer products. *Air Qual Atmos Health* 2015; 8(3):273–281.
- [Steinemann 2016]** Steinemann A. Fragranced consumer products: exposures and effects from emissions. *Air Qual Atmos Health* 2016; 9:861–866.
- [Steinemann 2017]** Steinemann A. Health and societal effects from exposure to fragranced consumer products. *Prev Med Rep* 2017; 5:45–47.
- [Steinemann 2018]** Steinemann A. Fragranced consumer products: sources of emissions, exposures, and health effects in the UK. *Air Qual Atmos Health* 2018; 11(3):253–256.
- [Steinemann 2018a]** Steinemann A. Exposures and effects from fragranced consumer products in Sweden. *Air Qual Atmos Health* 2018; 11(5):485–491.
- [Steinemann 2018b]** Steinemann A. Fragranced consumer products: effects on asthmatics. *Air Qual Atmos Health* 2018; 11(1):3–9.
- [Steinemann 2018c]** Steinemann A, Wheeler AJ, Larcombe A. Fragranced consumer products: effects on asthmatic Australians. *Air Qual Atmos Health* 2018; 11(4):365–371.
- [Terry 2019]** Terry MB, Michels KB, Brody JG, et al. Environmental exposures during windows of susceptibility for breast cancer: a framework for prevention research. *Breast Cancer Res.* 2019 08 20; 21(1):96.
- [Ventrice 2014]** Ventrice P, Ventrice D, Russo E, De Sarro G. Phthalates: European regulation, chemistry, pharmacokinetic and related toxicity. *Environmental toxicology and pharmacology*, 36(1), 88-96.
- [Wu 2020]** Wu AH, Franke AA, Tseng C, et al. Exposure to phthalates and risk of invasive breast cancer: The Multiethnic Cohort Study [abstract]. In: Proceedings of the Twelfth AACR Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved; 2019 Sep 20-23; San Francisco, CA. Philadelphia (PA): AACR; *Cancer Epidemiol Biomarkers Prev* 2020;29(6 Suppl_2):Abstract nr PR06.
- [Yang 2018]** Yang C, Lee HK, Kong APS, Lim LL, Cai Z, Chung ACK. Early-life exposure to endocrine disrupting chemicals associates with childhood obesity. *Ann Pediatr Endocrinol Metab.* 2018 Dec; 23(4):182-195.
- [Yilmaz 2020]** Yilmaz B, Terekeci H, Sandal S, Kelestimur F. Endocrine disrupting chemicals: exposure, effects on human health, mechanism of action, models for testing and strategies for prevention. *Rev Endocr Metab Disord.* 2020 03; 21(1):127-147.
- [Zeinomar 2020]** Zeinomar N, Oskar S, Kehm RD, Sahebzada S, Terry MB. Environmental exposures and breast cancer risk in the context of underlying susceptibility: A systematic review of the epidemiological literature. *Environ Res.* 2020 Aug; 187:109346.