

PHTHALATES IN FOOD THREATEN HUMAN HEALTH



Pregnant women and young children are especially vulnerable to toxic chemicals known as phthalates (pronounced THAL-eights). Manufacturers, retailers, and government agencies should follow the science: All remaining uses of phthalates should be phased out in favor of safer alternatives.

Phthalates are industrial chemicals widely used to soften plastics and as a solvent to carry ingredients in adhesives, inks, coatings, and fragrance.

Cao X-L (2010) **Phthalate Esters in Foods: Sources, Occurrence, and Analytical Methods.** *Comprehensive Reviews in Food Science and Food Safety* 9(1):21-43. <http://dx.doi.org/10.1111/j.1541-4337.2009.00093.x>

U.S. Environmental Protection Agency (2012) **Phthalates Action Plan.** Revised 03/14/2012. https://www.epa.gov/sites/production/files/2015-09/documents/phthalates_actionplan_revised_2012-03-14.pdf

U.S. Food and Drug Administration, **Cosmetics: Phthalates** (website). <http://www.fda.gov/Cosmetics/ProductsIngredients/Ingredients/ucm128250.htm>

Prenatal exposure to some phthalates is linked to a male genital condition, which may increase the risk of testicular and prostate cancer, and lower fertility.

CHAP Report (2014) Report to the U.S. Consumer Product Safety Commission by the **Chronic Hazard Advisory Panel on Phthalates and Phthalates Alternatives**, July. See pp. 14-29. <https://www.cpsc.gov/s3fs-public/CHAP-REPORT-With-Appendices.pdf>

Prenatal and childhood exposure to some phthalates affects brain development, and is associated with learning and behavior problems in children.

CHAP Report, pp. 29-33.

Project TENDR, **Phthalates.** <http://projecttendr.com/chemicals-and-pollutants/phthalates/>

Bennett D *et al.* **Project TENDR: Targeting Environmental Neuro-Developmental Risks. The TENDR Consensus Statement.** *Environmental Health Perspectives* 124:A118-A122. <http://dx.doi.org/10.1289/EHP358>

Phthalates reduce testosterone production and alter thyroid function, both of which are hormones essential to healthy development.

CHAP Report, pp. 18-19.

Meeker JD, Ferguson KK (2011) **Relationship between Urinary Phthalate and Bisphenol A Concentrations and Serum Thyroid Measures in U.S. Adults and Adolescents** from the National Health and Nutrition Examination Survey (NHANES) 2007-2008. *Environmental Health Perspectives* 119(10):1396-1402. <http://dx.doi.org/10.1289/ehp.1103582>;

Bernal J (2005) **Thyroid hormones and brain development.** *Vitamins and Hormones.* 71:95-122. [http://dx.doi.org/10.1016/S0083-6729\(05\)71004-9](http://dx.doi.org/10.1016/S0083-6729(05)71004-9)

Up to 725,000 American women of childbearing age may be exposed daily to phthalates at levels that threaten the health of their babies, should they be pregnant.

CHAP report, p. 45 and pp. 64-65.

Zota AR, Calafat AM, Woodruff TJ (2014) **Temporal Trends in Phthalate Exposures: Findings from the National Health and Nutrition Examination Survey, 2001-2010.** *Environmental Health Perspectives* 122(3):235-241. <http://dx.doi.org/10.1289/ehp.1306681>

CPSC (2017) **Estimated Phthalate Exposure and Risk to Women of Reproductive Age as Assessed Using 2013/2014 NHANES Biomonitoring Data.** U.S. Consumer Product Safety Commission, CPSC/EXHR/TR-17/XXX, February. <https://www.cpsc.gov/s3fs-public/Estimated%20Phthalate%20Exposure%20and%20Risk%20to%20Women%20of%20Reproductive%20Age%20as%20Assessed%20Using%202013%202014%20NHANES%20Biomonitoring%20Data.pdf>

Additional references are available upon request.

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ENVIRONMENTAL
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The **Environmental Health Strategy Center** works to ensure that all people are healthy and thriving in a fair and healthy economy. We promote science-based solutions that improve the safety of our food, water, and consumer products. We support economic development that creates good jobs and products that are safer for people and the planet.

The Strategy Center is a founding member of the **Coalition for Safer Food Processing & Packaging**, a national alliance of public health, food safety, and social justice organizations working to convince the food industry to eliminate sources of toxic chemicals in our food supply.

Many experts believe that there's no safe level of exposure to hormone-disrupting chemicals with widespread population exposure.

Diamanti-Kandarakis E, Bourguignon J-P, Giuduce LC, Hauser R, Prins GS, Soto AM, Zoeller T, Gore AC (2009) **Endocrine-Disrupting Chemicals: An Endocrine Society Scientific Statement.** *Endocrine Reviews* 30(4):293-342. See discussion under "Important issues in endocrine disruption: Nontraditional dose-response dynamics." <http://dx.doi.org/10.1210/er.2009-0002>

National Research Council (2009) **Science and Decisions: Advancing Risk Assessment**, Committee on Improving Risk Analysis Approaches Used by the U.S. EPA. See summary at pp. 8-9 and linear low-dose risk at pp. 127-187. <https://www.nap.edu/catalog/12209/science-and-decisions-advancing-risk-assessment>

Workers in several industries are also exposed to unacceptably high levels of phthalates.

Hines CJ, Nilson Hopf NB, Deddens JA, Calafat AM, Silva MJ, Grote AA, Sammons DL. (2009) **Urinary Phthalate Metabolite Concentrations among Workers in Selected Industries: A Pilot Biomonitoring Study.** *Annals of Occupational Hygiene* [2009] 53 (1):1-17. <http://dx.doi.org/10.1093/annhyg/men066>

Hines CJ, Hopf NBN, Deddens JA, Silva MJ, and Calafat AM (2011) **Estimated daily intake of phthalates in occupationally exposed groups.** *Journal of Exposure Science and Environmental Epidemiology* 21:133-141. <http://dx.doi.org/10.1038/jes.2009.62>

The food we eat is the major exposure pathway for phthalates for most people.

Clark, K, David RM, Guinn R, Kramarz KW, Lampi MA, Staples CA, (2011) **Modeling human exposure to phthalate esters: a comparison of indirect and biomonitoring estimations methods.** *Human and Ecological Risk Assessment* 17:923-965. <http://www.tandfonline.com/doi/abs/10.1080/10807039.2011.588157>

Fierens T, Servaes K, Van Holderbeke M, Geerts L, De Henauw S, Sioen I, Vanermen G (2012) **Analysis of phthalates in food products and packaging materials sold on the Belgian market.** *Food and Chemical Toxicology* 50:2575-2583. <http://dx.doi.org/10.1016/j.fct.2012.04.029>

Dairy products, baked goods, infant formula, meats, oils and fats, and fast foods are major contributors to dietary phthalates exposure.

Serrano SE, Braun J, Trasande L, Dills R, Sathyanarayana S (2014) **Phthalates and diet: a review of food monitoring and epidemiology data.** *Environmental Health* 13:43. <http://dx.doi.org/10.1186/1476-069X-13-43>

Sakhi AK, Lillegaard ITL, Voorspoels S, Carlsen MH, Loken EB, Brantsaeter AL, Haugen M, Meltzer HM, Thomsen C (2014) **Concentrations of phthalates and bisphenol A in Norwegian foods and beverages and estimated dietary exposure in adults.** *Environment International* 73:259-269. <http://dx.doi.org/10.1016/j.envint.2014.08.005>

Cirillo T, Latini G, Castaldi MA, Dipaola L, Fasano E, Esposito F, Scognamiglio G, Di Francsco F, Cobellis L (2015) **Exposure to Di-2-Ethylhexyl Phthalate, Di-N-Butyl Phthalate and Bisphenol A through Infant Formulas.** *Journal of Agricultural and Food Chemistry* 63:3303-3310. <http://dx.doi.org/10.1021/jf505563k>

Zota AR, Phillips CA, Mitro SD (2016) **Recent Fast Food Consumption and Bisphenol A and Phthalates Exposures among the U.S. Population in NHANES, 2003-2010.** *Environmental Health Perspectives* 124:1521-1528. <http://dx.doi.org/10.1289/ehp.1510803>

Phthalates migrate into food from food processing and food packaging, and from environmental contamination from other uses.

Cao X-L (2010) **Phthalate Esters in Foods: Sources, Occurrence, and Analytical Methods.** *Comprehensive Reviews in Food Science and Food Safety* 9(1):21-43. <http://dx.doi.org/10.1111/j.1541-4337.2009.00093.x>

Van Holderbeke M, Geerts L, Vanermen G, Servaes K, Sioen I, De Henauw S, Fierens T (2014) **Determination of contamination pathways in food products sold on the Belgian market.** *Environmental Research* 134:245-352. <http://dx.doi.org/10.1016/j.envres.2014.08.012>

Aurela B, Kulmala H, Soderhjelm L (1999) **Phthalates in paper and paperboard packaging and their migration into Tenax and sugar.** *Food Additives & Contaminants* 16(12):571-577. <http://dx.doi.org/10.1080/026520399283713>

Castel L, Mayo A, Gilbert J (1989) **Migration of plasticizers from printing inks into foods.** *Food Additives & Contaminants* 6(4):437-443. <http://dx.doi.org/10.1080/02652038909373802>

In Europe, most phthalates are banned in plastic food contact materials for fatty food, including dairy products, and infant food.

Annette Schafer (2013) **Phthalates in food – EU Regulatory overview: Food contact materials and Food Law**, European Commission (slides). http://www.euchinaagri.org/sites/default/files/03_phthalates_in_food_-_eu_regulatory_overview.pdf

European Commission (2011) Commission Regulation (EU) No 10/2011 of 14 January 2011 **on plastic materials and articles intended to come into contact with food.** *Official Journal of the European Union* L 12/1, 15.1.2011. <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32011R0010>

In the U.S., the FDA allows the use of 28 phthalates for food contact based on outdated regulations adopted more than 30 years ago.

U.S. Food and Drug Administration, **Indirect Food Additives**, Title 21 Code of Federal Regulations (CFR) Parts 174-178. <http://www.ecfr.gov/>

Natural Resources Defense Council, Environmental Defense Fund, et al. (2016) **Food additive petition regarding 30 ortho-phthalates** submitted to FDA pursuant to 21 USC Section 348. March 18. http://blogs.edf.org/health/files/2016/04/Ortho-phthalates_Food_Additive_Petition_3-18-16.pdf

Safer alternatives to phthalates are widely available, effective, and affordable.

Lott S (2014) **Phthalate-free Plasticizers in PVC**, Healthy Building Network. <https://www.healthybuilding.net/uploads/files/phthalate-free-plasticizers-in-pvc.pdf>

University of Massachusetts Lowell (2011) **Phthalates and Their Alternatives: Health and Environmental Concerns.** Lowell Center for Sustainable Production, Technical Briefing, January. https://www.uml.edu/docs/Phthalate%20and%20their%20Alternatives_tcm18-229903.pdf