The Phthalates

Phthalates are a class of chemicals commonly used in consumer products. Phthalates cause a wide range of adverse health problems including liver, kidney and lung damage as well as reproductive system and sexual developmental abnormalities. Phthalates are classified as "probable human carcinogens."

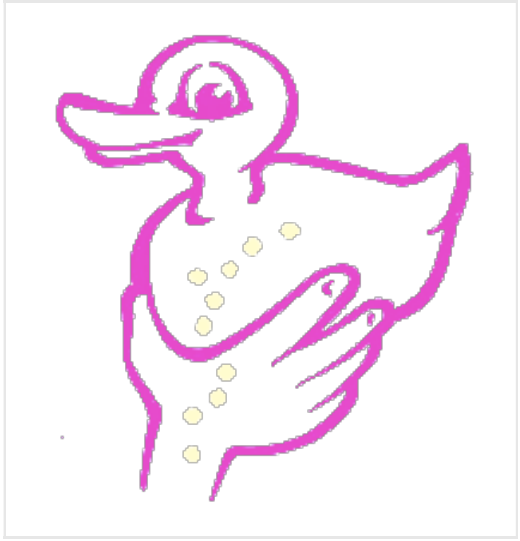
What are phthalates and how are they used?

Phthalates are a class of chemicals added to a number of common consumer products. In 1994, close to 87% of all phthalates in the United States were used as plasticizers, or softening agents, in vinyl products. Plasticizers are molasses-like materials that saturate a three-dimensional matrix, such as a stiff sponge. The sponge becomes flexible, but with time the molasses gradually exits, making the sponge stiff again. Soft vinyl products may contain more than 40% phthalates by weight. Humans are widely exposed to phthalates because vinyl is a ubiquitous plastic used to make anything from home furnishings (for example, flooring, wallpaper), medical devices (for example, catheters, IV- and blood bags), children's items (for example, infant feeding bottles, squeeze toys, changing mats, teethers) to packaging (for example, disposable bottles, food wrap).
Beyond vinyl, humans are further exposed to phthalates in cosmetics and scented products such as perfumes, soaps, lotions and shampoos. Phthalates are also added to insecticides, adhesives, sealants and car-care products.

Do we know phthalates are in our bodies? How do they get there?

A study released by the Centers for Disease Control (CDC) in 2001 confirmed that humans have certain phthalates in our bodies.

Eating, breathing and skin contact, as well as blood transfusion, are all ways, either together or alone, that phthalates make their way into our bodies. According to the U.S. Environmental Protection Agency (EPA), eating is probably the main route by which humans are contaminated with diethylhexyl phthalate (DEHP), the most widely used phthalate plasticizer. DEHP migrates into food from certain foodwraps during storage. Similarly, we are also contaminated with other commonly used phthalates such as diisononyl phthalate (DINP).



Children may take in higher than average amounts because many chew toys are made of highly phthalate-softened vinyl (for example, teethers). Indeed, the highest levels of DINP released from teethers and toys exceeded the acceptable daily intake level in studies, conducted in the Netherlands and Denmark, that simulated children's mouthing behavior. Furthermore, a Dutch study confirmed what most of us have observed --- children suck or chew their fingers and other things that are not intended to go into their mouths more than chew toys. This instinctive chewing undoubtedly adds to their overall intake of phthalates.

Blood transfusion is another route of human phthalate intake. Phthalates make their way from vinyl or PVC medical devices into solutions that are then fed into the patient. People who are ill, especially children whose systems are still developing, may be particularly sensitive to this type of exposure. In September of 2001, The U.S. Food and Drug Administration (U.S. FDA) warned that some medical devices made of vinyl may expose certain patients to unsafe amounts of the phthalate DEHP. Later, The American Medical Association (AMA) voiced concerns about DEHP-containing medical devices, and a Health Canada Advisory Panel further recommended that health care providers not use DEHP-containing medical products in certain patient groups including infants and males before puberty. Concerns have in fact been raised by the National Toxicology Program that the developing, but not mature, male genital tract in humans may be adversely affected by high levels of DEHP.

Breathing in air and dust containing phthalates that have escaped from vinyl flooring also adds to the amount of phthalates in our systems. Again, this is particularly worrisome for children since they spend a lot of time indoors breathing close to the floor. In fact, an initial study conducted in Norway reported a higher incidence of bronchial obstruction in children living in houses with vinyl, as opposed to wooden, floors. Phthalates being released into the air may be the link between these two observations.

Skin contact could be a very important route of phthalate intake from personal care products such as soap. In the CDC study of phthalates, the breakdown product of diethyl phthalate (DEP) was detected in the highest level in the tested population. DEP is used in a number of scented products such as soaps, lotions and perfumes. DEP is also found in plastic products like toothbrushes, toys and food

packaging.

How do phthalates affect our health?

Recently, the National Toxicology Program (NTP) expressed concern over the adverse development of babies born to pregnant women who take in DEHP at the normal levels estimated for an adult. They also expressed concern that male infants and toddlers who substantially exceed adult DEHP intake estimates could suffer problems in their reproductive system development.

DEHP has been classified as a "probable human carcinogen" by the EPA. The Department of Health and Human Services has also classified DEHP as a potential carcinogen. That is to say, DEHP may reasonably be considered a cancer causing substance in humans. Rats and mice fed DEHP and DINP also showed an increase in liver cancers over animals that had not been fed the chemicals.

The offspring of rats separately fed three different phthalates, namely diethyl hexyl-, diisononyl- and butyl benzyl phthalate (DEHP, DINP and BBP, respectively), do not follow normal patterns of sexual development. In the case of DEHP-fed and BBP-fed rats, the weight of the offspring was also reduced. Other studies also report subtle effects of DEHP in the testes of young rats at very low levels.

High doses of diethyl phthalate (DEP) given to female rats have been shown to cause the growth of an extra rib in their offspring. Additionally, female animals exposed to DEP throughout their lives experience an elevated number of stillbirths. According to a 1996 report from the Agency for Toxic Substances and Disease Registry (ATSDR), “No information is available regarding possible effects caused by diethyl phthalate if you breathe, eat, or drink it, or if it touches your skin.” This is a troubling statement given the diversity of products to which DEP is added. Furthermore, it highlights the inadequate regulations for widely used commercial chemicals.

How is the government regulating phthalates?

In 1999, prompted by the potential of babies to intake dangerous amounts of phthalates and the serious, negative health effects found in animal studies, the European Union placed an emergency ban on the use of certain phthalates in toys made for children under the age of three. This emergency ban was recently renewed. In the United States, the Consumer Product Safety Commission (CPSC) and the Toy Manufacturers of America (TMA) agreed upon a voluntary limit of DEHP at 3% in pacifiers and teethers in 1986. Later in 1998, the CPSC asked toy manufacturers to voluntarily withdraw vinyl

teething rings and rattles containing the phthalate DINP from the market. However, such voluntary agreements do not stop the use of, and children's exposure to, hazardous or untested additives. Similarly, adults are also exposed to potentially hazardous chemicals by using any number of phthalate-containing products.

Regulations are also in place for phthalates in plastics that come into contact with food such as during its processing, transportation and storage. The Food and Drug Administration (FDA) states that butyl benzyl phthalate (BBP) and diisononyl phthalate (DINP) "may be safely used" at levels up to 1% and 43%, respectively. Closer inspection, however, reveals provisions that are very likely to be broken. For example, the regulation states that the plastics should be used "at temperatures not exceeding room temperature". This implies that warming food wrapped in plastic in a microwave may be considered unsafe -- a practice many in this country exercise on a daily basis.

Note: Environmental health experts recommend that one way to avoid phthalate exposure is to avoid microwaving foods in plastic if you are not sure whether your food wrap or plastic container is made with PVC.

Who is working to eliminate phthalates, and how can I help?

To learn how you can avoid exposure to phthalates and other hazardous chemicals added to vinyl, visit the organizations and websites listed below. Not only will you learn more about the entire vinyl lifecycle, you can join consumer campaigns and add your voice to the chorus of people calling to eliminate this damaging plastic.

Organizations:

Phthalates in building products:

Healthy Building Network, www.healthybuilding.net

Contact: Bill Walsh, 202-232-4108, bill@healthybuilding.net

Phthalates in cosmetics:

Coming Clean, www.come-clean.org

Contact: Bryony Schwan, 406-543-3747,swan@womenandenvironment.org

Phthalates in medical devices:

Health Care Without Harm, www.noharm.org

Contact: Stacy Malkan, 202-234-0091, ext. 14, smalkan@hcwh.org

Phthalates in nail polish:

Environmental Working Group, www.ewg.org

Contact: Mike Casey, 202-667-6982, mcasey@ewg.org

Phthalates in toys:

Greenpeace

Contact: Lisa Finaldi, lisa.finaldi@dialb.greenpeace.org