

# CONSUMER GUIDE: Phthalates and Bisphenol A



## What are Phthalates and BPA?

- **Phthalates and BPA are man-made chemicals called endocrine disruptors.**
- **Phthalates and bisphenol A (BPA) are used for a variety of purposes in plastics and personal care products.**
- **They can affect hormones such as estrogen and testosterone, which are important for the reproductive system.**
- **They can potentially interfere with normal growth and brain development.**

### **Phthalates** can be found in:

- The US food supply, as contaminants (i.e. from plastics used in conveyer belts, jar lids, tubes storing food, gloves, packaging, storage). Processed foods and high fat dairy and meats are especially high in phthalates.
- Personal care products (i.e. shampoos, lotions, makeup, perfume).
- PVC building materials and dust generated from these materials.
- Plastic medical devices (i.e. IV tubing, IV fluid/total parenteral nutrition bags, catheters).
- Some time-released medications.

### **Bisphenol A (BPA)** can be found in:

- Food can linings (to keep the metal from rusting).
- Polycarbonate food and beverage containers.
- Thermal /carbonless receipts (to stabilize ink).
- Some dental sealants that are applied in the dentist's office.

## How can my family be exposed to Phthalates and BPA?

- Phthalates and BPA can be eaten (ingested), breathed in (inhaled), and absorbed through the skin.
- Children can have higher intakes of these chemicals compared to adults because of their unique behaviors (such as putting things in their mouths and breathing faster than adults).
- The Pediatric Environmental Health Specialty Units (PEHSU) recommend a precautionary approach. The information below will summarize health effects and help reduce exposures.

## What are the health effects of Phthalates and BPA?

Many doctors and scientists are concerned about phthalates and BPA because they can change the way hormones such as estrogen and testosterone work in our body. Hormones help control body, brain, and reproductive development. Most of the health information we know about these chemicals comes from animal studies. Researchers are continuing to study how they impact health in humans.

Early childhood or fetal exposure to these chemicals, during important developmental windows, may have lasting effects throughout life.

### Phthalates can affect hormone (testosterone) concentrations and growth/development:

- In studies using animals, phthalate exposure when the fetus is developing can increase the risk of:
  - Problems with male reproductive organs
  - Decreased birth weight
- In children, scientists have observed that phthalate exposures may place the developing fetus at increased risk for:
  - Changes in male reproductive organs, like hypospadias (positional change of the opening on the penis)

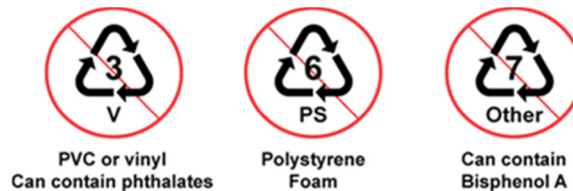
- Changes in reproductive hormones
- Increased allergies, runny nose, and eczema
- In adults, phthalates may be associated with changes in sperm quality.

BPA can affect hormone (estrogen) concentrations. It is associated with a variety of medical disorders:

- In animals, low concentrations of BPA exposure when the fetus is developing may increase the risk for:
  - Behavior changes like hyperactivity, more aggression, and learning problems
  - Early puberty
  - Changes in breast and prostate cells
  - Increased fat cells and body weight
  - Changes in the immune system
- In humans, BPA exposure when the fetus is developing may increase the risk for:
  - Behavior issues (like hyperactivity and aggression)
  - Later breast development during puberty
  - Obesity and Diabetes
  - Heart disease
  - Changes in liver function

### How do I reduce my family's exposure to these chemicals?

1. **Buy low fat dairy products such as skim milk and low fat cheeses.** Avoid high fat foods such as cream, whole milk, and fatty meats as much as possible.
2. **Buy fresh or frozen fruits and vegetables when possible. Avoid canned and processed foods.**
3. When possible, purchase items that are phthalate free or BPA free.
4. Minimize personal care product use. Keep it simple, less is more.
5. Use glass, stainless steel, ceramic, or wood to hold and store foods instead of plastics.
6. Do not microwave food/beverages in plastic.
7. If using hard polycarbonate plastics (some water bottles/baby bottles/sippy cups), do not use for hot liquids.
8. If plastics cannot be avoided, use the following guide to avoid particularly dangerous plastics. Check the symbol on the bottom of plastics containers and try to avoid the plastics marked 3 (PVC or vinyl), 6 (polystyrene foam), or 7 (other, can contain BPA)<sup>1</sup>:



9. Encourage frequent handwashing.
10. Minimize handling of receipts.
11. Take shoes off at home to avoid tracking in dust that may contain these chemicals.
12. Keep carpets/windowsills clean - vacuum and wet dust frequently to minimize dust that may contain these chemicals.

### What's the Bottom Line?

Scientists and healthcare providers are concerned about phthalates and BPA because they are widely prevalent in everyday products, and universal exposures in the US population have been documented. The full extent of their potential health impacts is still unknown, but research supports a potential role in a wide range of health conditions. Until more is known, it is best to take a precautionary approach by preventing and reducing phthalate and BPA exposures.

<sup>1</sup> Code #6: Styrene, a potentially toxic chemical, may be released from containers made from polystyrene foam (Styrofoam and related brands). Code #7 covers "other" plastics, which includes polycarbonate. Therefore not all code #7 plastic bottles contain polycarbonate and leach BPA. Also, BPA can be given off from other products.

**Find your local Pediatric Environmental Health Specialty Unit at [www.aoec.org/PEHSU.htm](http://www.aoec.org/PEHSU.htm) or call 1-888-347-2632 to get more information.**

### **Resources**

American Academy of Pediatrics Council on Environmental Health. Etzel R, ed. *Pediatric Environmental Health*. 3rd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012. (*aka, AAP Green Book*)

Braun JM, Hauser R. Bisphenol A and children's health. *Curr Opin Pediatr*. 2011; 23(2): 233-9. doi: 10.1097/MOP.0b013e3283445675.

Braun JM, Sathyanarayana S, Hauser R. Phthalate exposure and children's health. *Curr Opin Pediatr*. 2013; 25(2): 247-54. doi: 10.1097/MOP.0b013e32835e1eb6.

Centers for Disease Control and Prevention. Fourth Report on Human Exposure to Environmental Chemicals, 2009. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at: <http://www.cdc.gov/exposurereport/>.

Claudio L, Chace R. Quick Guide to Plastics. Staying Healthy in a Changing Environment #3. New York: Mount Sinai Community Health Bulletin; 2006.

Diamanti-Kandarakis E et al. Endocrine-Disrupting Chemicals: An Endocrine Society Scientific Statement. *Endocrine Reviews*. 2009.; 30(4): 293-342.

Gray LE, Jr., Wilson VS, Stoker T, Lambright C, Furr J, Noriega N, Howdeshell K, Ankley GT, Guillette L. Adverse effects of environmental antiandrogens and androgens on reproductive development in mammals. *Int J Androl*. 2006; 29(1): 96-104; discussion 5-8.

NIEHS. Since You Asked - Bisphenol A. NTP Brief; 2008.

Shea KM, American Academy of Pediatrics Committee on Environmental Health. Pediatric exposure and potential toxicity of phthalate plasticizers. *Pediatrics*. 2003; 111(6): 1467-1474.

World Health Organization. Bergman Å, Heindel J, Jobling S, Kidd K, Zoeller RT, eds. State of the Science of Endocrine Disrupting Chemicals – 2012. Geneva: United Nations Environment Programme and the World Health Organization; 2013.

*Last updated 2/2014. Acknowledgment: A. Otter, DNP, ARNP, S. Sathyanarayana, MD, MPH, Northwest PEHSU. M. Galvez, MD, MPH, P.E. Sheffield, MD, Mount Sinai PEHSU. National PEHSU Education Committee.*

*This material was supported by the Association of Occupational and Environmental Clinics (AOEC) and funded under the cooperative agreement award number 1U61TS000118-03 from the Agency for Toxic Substances and Disease Registry (ATSDR).*

*Acknowledgement: The U.S. Environmental Protection Agency (EPA) supports the PEHSU by providing funds to ATSDR under Inter-Agency Agreement number DW-75-92301301-03. Neither EPA nor ATSDR endorse the purchase of any commercial products or services mentioned in PEHSU publications.*