How Plastics and Plasticizers Effect our Health

Cindy Klement, MS, CNS, MCHES
Ann Arbor, MI

Phthalates

• Developed in the 1920s, phthalates are chemicals that are used to add heat resistance, transparency, durability and plasticity to products manufactured from polyvinyl chloride (PVC)
What Are Phthalates Used For?

- In the manufacture of garden hoses, inflatable swimming pools, food packaging and films, raincoats, gloves, footwear, artificial leather, Rx medication and supplement coatings, toys, lubricants, tablecloths, shower curtains, carpets, vinyl flooring and tile, wallpaper, paint, furniture, insecticides, automobile upholstery, sheathing for wire and cable, laboratory solvents and reagents, blood storage bags, and medical tubing.

Constant Exposure to Phthalates

- Phthalates are not bioaccumulative or persistent chemicals, but throughout life humans are continuously exposed through diet, plastic, PVC, and personal care products.
Occupational Exposure

- Employed where phthalates or plastics are manufactured or used
- Food processing and packaging
- Personal care products manufacturing
- Polyvinylchloride fabrication workers
- Waste management workers, sewage treatment
- Wearing surgical gloves
- Work in a nail salon

Personal Exposure

- Baking modeling clay
- Denture lining materials
- Drinking bottled water
- PVC flooring, shower curtains
- Plastic food containers, food packaging, and films
- Diets high in meat and dairy products
- Consumption of vegetable oils from plastic containers
- Children mouthing plastic toys
- Personal care products; wear perfume or cologne
Personal Care Products

• Skin absorption of phthalates from personal care products and cosmetics can be up to 10x greater on the face than the arm

Exposure to Contaminated Foods

• According to an assessment by the NTP, 90% of exposure occurs through the consumption of foods that come into direct contact with it either through manufacturing or through migration from food packaging
Pro-Estrogenic and Anti-Androgenic

• Phthalates act as a synthetic form of estrogen influencing hormone levels
• They also exhibit anti-androgenic properties resulting in potentially altered male reproductive development

Pregnancy and Phthalates

• Concentrations of certain phthalates detected through biomonitoring studies in the urine of pregnant women has firmly established an adverse association on child behavioral and/or cognitive development
Children’s Exposure

• Soft toys contain higher levels when compared to hard toys
• This creates a risk for children mouthing plasticized toys and teethers

Phthalates Associated with Increase in Size

• Beginning in 1999 in the U.S, every 5 years six metabolite levels of phthalates are monitored in 5,000 subjects
• Data shows phthalates are detected in 100% of children, and nearly 50% of adults
Possible Health Concerns Related to Phthalate Exposure

• Behavioral problems in children, depression, aggression, reduced IQ, ADD
• Allergies, asthma, eczema in children and premature puberty
• Thyroid hormone imbalance, insulin resistance, distorted levels of testosterone, estradiol, follicle-stimulating hormone
• Testicular toxicity, abnormal sperm, reduced sperm motility and quantity
• Breast cancer, endometriosis, uterine fibroids, premature labor

Legislative Action on Phthalates

• Although phthalates fall under the Toxic Substances Control Act in the U.S., they remain basically unregulated in consumer products
Limiting Exposure

- Refrain from the use of artificial fragrance - consider essential oils!
- Avoid containers with #3 recycling code, as well as bottled water
- Purchase vegetable oils packaged in glass containers
- Find phthalate-free toys and building/renovation products

Assess Your Understanding – True or False?

- Phthalates do not accumulate in the body, but constant exposure is a concern.
- Children are not affected by phthalate exposure.
- Personal care products and foods packed in plastic are sources of phthalates exposure.
History of BPA (Bisphenol A)

• First produced in 1891 by Russian chemists
• Commercial production began in the 1940s-1950s

What is BPA Used For?

• Water containers & lids, car bumpers, water supply lines, greenhouses, CDs and DVDs, cell phones, computers, sport safety equipment, printed circuit boards, eyeglass lenses, flame retardants
How Are We Exposed?

- Water
- Fish consumption
- Foods packaged in plastic
- Paper products
- Air and dust
- Medical devices
- Occupationally

Water

- Exposure through bottled water due to the migration of additives and plasticizers
Fish Consumption

Fish along the Allegheny and Monongahela Rivers in the Greater Pittsburg Area examined for BPA showed 76% with detectable levels of BPA.

Foods Packaged in Plastic

- Fatty foods are able to extract BPA from plastic storage containers
- Heating frozen prepared meals packaged in plastic in the microwave
- Wrapping or storing leftovers in plastic
- BPA lined cans
Paper Products

- Used as a developer in paper production, BPA is also found in paper plates and cups, newspapers, magazines and even toilet paper

Air and Dust

- BPA was found in 95% of the dust samples analyzed in the Eastern United States
Medical Devices

• IV bags, feeding tubes, catheters, incubators
• Dental sealants

Occupationally

• Employed in plastics industry or the manufacture of anything made from plastic
• Employed in the paper industry
• Dentist or dental assistant
• Cashiers, handling of thermal papers
• Recycling plant
Where Is BPA Stored in the Body?

• BPA has been detected in urine, blood, amniotic and follicular fluid, placental tissue, breast milk, colostrum, semen, umbilical cord blood, saliva and adipose fat tissue

Accumulation in Our Bodies

• Human studies have indicated that BPA can be a causal effect of prostate cancer, CVD, neurobehavioral complications and liver enzyme abnormalities
Further Possible Health Outcomes

• Alterations in thyroid and pituitary function
• Prostate and testicular cancers
• Reduced male fertility, declined semen quality, increased sperm DNA damage
• Premature puberty, premature labor
• Reduced birth weight, recurrent miscarriages

Cardiometabolic Disorders and Obesity

• A correlation exists between the occurrence of diabetes and BPA exposure – levels are significantly higher in borderline and diagnosed diabetes patients than in non-diabetics
How Can We Limit Exposure?

• Consider glass and stainless steel for food storage and beverages
• Wash hands after handling paper
• Consider regular testing if you drink well water
• Explore safe options for disposable dining ware
• Adhere to fish advisories
• Check whether canned goods are lined with BPA
• Give up smoking – cigarette filers contain up to 25% BPA

Assess Your Understanding – True or False?

• Heat does not affect the BPA content of water stored in bottles.
• BPA accumulates in the body.
• We can limit our exposure to plastics and plasticizers, although more than likely cannot totally avoid it.
Legal Break

• Announce any news, do a drawing!

Where Do We Start?

• Let’s start with young child-bearing women
• Teach them about BPA and Phthalate exposure and the dangers to their future offspring
How Can We Detoxify Plastics?

- Drink plenty of water
- Sweat ‘em out – through sauna, exercise
- Use Probiotics, Quercetin, Korean Ginseng, Chlorophyll, Phytonutrients

ORAC-Quercetin Combination

- Quercetin may help stabilize cells that release compounds when exposed to irritants
- Also contains Green Tea, Mangosteen, Resveratrol, Turmeric, Acai Berry
Korean Ginseng

• Asian ginseng is a gnarled root that looks like a human body with stringy shoots for arms and legs
• Long ago, herbalists thought that because of the way ginseng looks it could treat many problems, from fatigue and stress to asthma and cancer

Liquid Green Drink

• Digestive tract detoxifier
• Supports detoxification
• Fresh mint flavor
Chlorophyllin and Body Odor

• In the 1940s and 1950s chlorophyllin was shown to have deodorizing effects on foul-smelling wounds leading clinicians to administer chlorophyllin orally to patients with colostomies and ileostomies in order to control fecal odor

Chlorophyllin and Wound Healing

• Research in the 1940s indicated that chlorophyllin slowed the growth of certain bacteria and accelerated the healing of experimental wounds in animals
Chlorophyll Content of Foods

Phytonutrients

- **Carotenoids** – tackle harmful free radicals that damage tissue in body
- **Lycopene** – linked to a lower risk of prostate cancer
- **Lutein** – cataracts, macular degeneration
- **Flavonoids** – reduce inflammation, reduce asthma, cancer, CHD, antioxidant
- **Glucosinolates** – hold in check the development and growth of cancer
Phytonutrients

- Apple, green tea leaf – *flavonols, polyphenols, lignans*
- Flax seed – *lignans*
- Acacia gum, guar gum - *polyphenols*
- Broccoli flowers, cabbage leaf – *glucosinolates, carotenoids, flavonols, lignans*
- Carrot root, red beet root - *carotenoids*
- Tomato – *lycopene, lignans*
- Rosemary, olive leaf, turmeric - *polyphenols*
- Grape Seed – *lycopene, flavonols*

Purification Mix Formula

- Supports cellular integrity and function of the intestinal lining
- Aids in gut metabolism and microbiome balance
- Balances gut pH to balance beneficial bacteria
- Activates detoxification signaling
- Supports elimination
- Nation of heavy metals
Purification Mix Formula

• L-Glutamine – repairs the intestinal lining
• Inulin - enhances fecal elimination by tying up toxins and encouraging us to go to the bathroom more often

Probiotics

• Feed the gut microbiome
14-Day Berry Flavored Cleanse

- Digestive system cleansers
  - Bentonite clay, freeze-dried aloe vera
- Colon cleansers
  - Cascara sagrada, buckthorn, turkey rhubarb
- Liver and blood cleansers
  - Burdock, red clover, milk thistle

14-Day Berry Flavored Cleanse

- *Bentonite Clay* decrease the re-uptake of some compounds in the body, absorbs toxins
- *Malic acid* appears to assist with the removal of aluminum
- *Capsicum* – Native Americans used as food for over 9,000 years. Anti-ulcer protective effects, anti-bacterial
- *Burdock* – blood purifier, diuretic, contains dietary fiber, has prebiotic properties
14-Day Berry Flavored Cleanse

- *Marshmallow* – used over 2000 years as a food, gel-forming to coat stomach and reduce irritation
- *Sarsaparilla* – traditionally used to treat diarrhea and rehydrate body, anti-microbial, aids liver, heart, nerves
- *Echinacea* – Native Americans used 400 years to boost immune system, fight infection and viruses

14-Day Berry Flavored Cleanse

- *Cascara sagrada* – promotes peristalsis
- *Buckthorn* – laxative properties
- *Licorice* – demulcent, soothing and coating agent, anti-stress and anti-depressant properties
- *Turkey Rhubarb* – astringent action, helpful in cases of diarrhea
14-Day Berry Flavored Cleanse

- *Ginger* – liver protective, anti-spasmodic, improves tone of intestinal muscles, helps digestion, diarrhea, nausea for over 2000 years
- *Oregon grape* – improves digestion and absorption
- *Couchgrass* – diuretic demulcent
- *Red Clover* – antispasmodic, expectorant, anti-fungal

14-Day Berry Flavored Cleanse

- *Fenugreek* – soothes inflamed conditions of the stomach and intestines
- *Yellow dock* – tonic to the stomach, blood purifier
- *Dandelion* – TCM used for diarrhea, improve immune system, detoxify liver and gallbladder, aid kidney function
- *Milk Thistle* – studies show protect liver from toxins, helps liver repair itself by growing new cells, recommended to patients with chronic liver disease
14-Day Berry Flavored Cleanse

- *Psyllium* – gel-forming, fermenting plant, softens stool, soluble/insoluble fibers
- *Aloe* – used for thousands of years for constipation; one of the most frequently prescribed herbs throughout most of the 18th and 19th centuries; remains one of the most commonly used herbs in the United States today

The Importance of Gut Microbiome Balance

“It’s like a garden – you’re less likely to have weeds growing if you have lush vegetation, but without this vegetation the weeds can potentially take over.”

Sarkis Mazmanian, Microbiologist, California Institute of Technology
With This New Knowledge, How Can I Help Others Detox their Plastic Overload?

• I can stress the importance of preventing exposure
• And I can recommend the following supplementation:
  • Daily use of Liquid Green Drink, Probiotics, ORAC-Quercetin Combination, and Purification Mix Formula
  • Korean Ginseng – cycles of 4 weeks on, 8 weeks off
  • Quarterly detoxification with 14-Day Berry-Flavored Cleanse

Resources:

• The Collaborative on Health and the Environment website displays diseases linked to BPA, grouped by strength of evidence. For information on health concerns related to BPA, visit http://www.healthandenvironment.org/tddb/contam/?itemid=2898
• The Environmental Working Group website updates information on BPA-lined canned food. It is available at: http://www.ewg.org/research/bpa-canned-food.
Additional Resources:

- For fish consumption advisories, visit the Environmental Protection Agency’s website: [https://www.epa.gov/fish-tech](https://www.epa.gov/fish-tech)
- Check whether or not there is a bisphenol A supplier or manufacturer near your home by visiting [http://productsourcing.thomasnet.com/results.html?cov=NA&what=bisphenol+A](http://productsourcing.thomasnet.com/results.html?cov=NA&what=bisphenol+A)

**Additional Resources:**