

Plastics and Child Health

What Recent Science Tells Us

Based on findings from 23 peer-reviewed scientific studies and scientific sources.

Human disease is increasingly linked to plastic exposures, and children are especially vulnerable.

Why children are more vulnerable to plastic exposures

Research agrees that children are more vulnerable to environmental exposures. The American Academy of Pediatrics and multiple studies have found that children have higher metabolic rates than adults, possess underdeveloped organs that cannot metabolize and discard toxicants as efficiently as adults, have higher surface area to volume ratios resulting in **greater toxicant absorption pound for pound, and consume more food and liquid relative to their body weight.**^{1 2}

A Growing Health Concern

Animal and human studies have detected plastics throughout the body. This includes the lungs, brain, heart, gut, blood, and breast milk.³ Recent scientific evidence suggests that this exposure may be linked to:

- damage to the intestinal lining⁴
- changes to the gut microbiome³
- inflammation and oxidative stress⁵

Studies have also identified **several chemical additives used in food contact materials as harmful to child health**, including:

- Phthalates, added to make plastics more flexible⁶
- Bisphenols such as Bisphenol A or BPA, used to make plastics stronger and more rigid⁷
- Flame retardants, added to reduce flammability⁸
- Per- and polyfluoroalkyl substances (PFAS) used to create grease or water resistant surfaces⁹

Contaminating our Food

Studies have found that **plastic food containers can leach microplastics and nanoplastics into food and beverages** through thermal stress, such as contact with hot food, and mechanical stress, such as friction from scratching, cutting, stirring, or repeated use.^{10 11}

- Microplastics are plastic particles < 5 mm, comparable to a grain of sand and smaller.¹²
- Nanoplastics are particles <1 µm, comparable in size to things like viruses.¹³

Research shows that plastics often contain chemical additives that are intentionally added to influence their properties such as flexibility, durability, heat resistance, or flame resistance.⁵ These **chemicals can also leach into food and beverages when heated and even at room temperature.**^{14 15 16}

Did you know?

A 2023 study from the University of Nebraska-Lincoln, found that **microwaving food in plastic containers for 3 minutes** caused some containers to release as many as 4.22 million microplastic and 2.11 billion nanoplastic particles from just one square centimeter of plastic.¹¹

**That is almost
10 million microplastics and
11 billion nanoplastics
in a teaspoon.**

Hidden Toxicants in Black Plastic

Research regarding specific considerations for black plastics is still emerging. However, a 2018 paper on the life cycle of black plastics reported that due to their high demand black plastics are commonly sourced from recycled electronic waste such as TV casings, introducing hazardous substances into everyday consumer products.¹⁷ As such, studies have found that chemicals used in electronics have made their way into some black plastics. This includes:

- **heavy metals including lead, mercury, and cadmium**, well-established neurotoxicants, have been detected in black plastics.¹⁷
- brominated flame retardants (BFRs), a group of toxic chemicals associated with cancer, endocrine disruption, and neurotoxicity, have been detected in black plastic consumer items.^{18 17}

These findings were further supported by a 2024 peer-reviewed study in *Chemosphere*, which detected high concentrations of BFRs specifically in black plastic kitchen utensils, food service ware, and toys sold in the United States.¹⁹

Chemical Consequences

Studies examining the health effects of prenatal and childhood exposure to chemical additives provide evidence they act as endocrine disruptors, (i.e. disrupt the body's hormonal system).⁵ These chemicals have been associated with many different health outcomes. For example:

- Research reports that phthalates are associated with cognitive impacts, neurodevelopment, respiratory issues like asthma, precocious puberty in girls, and metabolic disorders in children.^{9 20}
- Studies have found that bisphenols are associated with insulin resistance, obesity, and hypertension in children.⁹
- Scientific investigations have found that flame retardants are linked to disrupted thyroid function and neurodevelopmental problems including IQ loss.⁹
- PFAS exposure has been associated with neurodevelopment and obesity in children in scientific literature.⁹

Routes of Exposure

Evidence shows that children are exposed to plastics through three pathways. (1) Ingestion is a major pathway of exposure, for example a child may consume food and beverages contaminated with plastic or its chemical additives.²¹ (2) Inhalation is also a significant source of exposure according to research, as microplastics are present in indoor air.²¹ (3) Dermal absorption is another recognized route of exposure in the literature as chemicals can migrate from plastic products through the skin.²¹

Did you know?

Recent studies have detected microplastics in the placenta, umbilical cord blood, and newborns' first stool, indicating that **exposure to plastic particles may begin before birth.**²²

Scientists are now studying how this early-life exposure affects child development.²²

Reducing Exposure

Scientists agree that there are ways we can reduce exposure to plastic and its chemical additives. Along with policies that limit plastic exposure,⁵ a few simple actions include:

- Avoid heating or storing hot foods in plastic.²³
- Drink tap water instead of plastic when possible.²³
- Avoid putting plastic in the dishwasher.²³
- Choose glass or stainless steel when possible.²³

Conclusion

Studies show childhood is a vulnerable period to environmental exposures. A growing body of scientific evidence indicates reducing child exposure to plastic can help promote healthy child development.

Authored by Teresa Herrera, MPH, independently and in a volunteer capacity, in collaboration with Cafeteria Culture. This fact sheet summarizes published scientific literature and does not represent original research conducted by the author or [Cafeteria Culture](#).

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