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Toxic chemicals can enter food through packaging. We made a list.

By [Tom Neltner](#) / Published: March 26, 2019

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This is the second in a [series](#) evaluating the challenges in single-use food packaging waste.

In the late 1980s, the [Council of Northeast Governors \(CONEG\)](#) was concerned that heavy metals in packaging would accumulate in recycled materials to levels that presented serious health concerns.

The organization drafted model legislation that prohibited the intentional addition of mercury, lead, cadmium, and hexavalent chromium to any component of packaging, including inks. It also set a 100 parts-per-million limit on the total amount of these four heavy metals. To ensure compliance, companies making packaging materials had to provide certificates of compliance to downstream purchasers and report compliance to the states.

CONEG also established the [Toxics in Packaging Clearinghouse](#) to maintain the model legislation, coordinate implementation of state legislation, and serve as a resource for companies seeking compliance information. The Council's hypothesis: **protecting virgin material from contamination will improve the recyclability of post-consumer materials and protect public health.**

Over the years, 19 states have adopted a variation of the model legislation. In 2018, the [State of Washington](#) took an unprecedented step of expanding its version of the legislation from heavy metals to include per- and poly-fluorinated alkyl substances (PFAS). PFAS are bioaccumulating, persistent chemicals and are associated with an array of health problems including endocrine disruption and children's developmental harm. The State was concerned that paper and cardboard food packaging treated with these chemicals may be [contaminating composting](#) and paper recycling processes post-consumer.

Beyond PFAS: More toxic chemicals of concern in food packaging

In addition to [heavy metals](#) and PFAS, EDF has identified other chemicals in food packaging and food handling equipment, whose ubiquity and potential health impacts raise serious concerns about food safety and contamination of the recycling stream. These chemicals appear in either plastic or paper packaging or both.

1. Intentionally added ingredients

- a. **Ortho-phthalates** (primarily used in plastic but many other uses including printing inks): [Studies](#) show that these chemicals are linked to endocrine disruption, developmental and reproductive toxicity. Their contamination of food is widespread. Their safety is currently under review by FDA.
- b. **Perchlorate** (anti-static agent used in plastic for dry food and in food handling equipment): This chemical disrupts the thyroid gland's normal function and reduces production of the thyroid hormone needed for healthy fetal and child brain development. Food contamination is [widespread](#); especially problematic is the increase of perchlorate levels in baby food dry cereal. The safety of perchlorate is currently under review by FDA.
- c. **Per- and poly-fluorinated alkyl substances** (grease-proofing agent used in paper packaging): PFAS, often distinguished as long-chain or short-chain, are bioaccumulating, persistent chemicals associated with an array of health problems including endocrine disruption and children's developmental harm. There is widespread human exposure to PFAS; water and food are the likely [sources](#). PFAS in food packaging will be banned in Washington State two years after the state finds suitably available safer alternatives or in 2022, whichever date gives manufacturers more time to redesign packaging.

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d. **Benzophenone** (used as a plasticizer in rubber articles intended for repeat use): Citing the carcinogenic evidence regarding benzophenone, FDA has banned its use as a flavor and in food packaging. The bans go into effect in 2020.

2. **Residual processing aids**

- a. **Ethyl and methyl glycol, toluene, and n-methyl-pyrrolidone (NMP)**: These solvents, often used in printing inks, leave residues in packaging and pose a risk of reproductive or development harm. Toluene and NMP have been targeted for removal in other product categories as well. Toluene has been targeted by a number of retailers, including Amazon and Rite-Aid, for removal from personal care and beauty products. NMP has been targeted for removal from paint strippers by several retailers including Home Depot, Lowe's, and Walmart. EPA has proposed banning use of NMP as a paint stripper and is expected to finalize that proposal for retail sales soon.
- b. **Bisphenol A, B, F, S** (used to make epoxy lining in metal cans, to make polycarbonate plastic, and ink): One or more bisphenol compounds has been linked to endocrine disruption, developmental and/or reproductive toxicity. BPA is already banned for baby bottle use or coating of infant formula packaging. BPS became a common replacement to BPA in packaging, but recent [studies](#) demonstrate similar health concerns to BPA.

3. **Contaminants**

- a. **Heavy metals (lead, arsenic, cadmium, chromium VI, and mercury)**: These chemicals are highly toxic and have been regulated in a variety of applications. EDF has demonstrated heavy metal [contamination](#) in food, particularly baby food. Though not intentionally added, contamination of food packaging may be a source. FDA's [Toxic Elements Working Group](#) is evaluating children's exposure to heavy metals across all foods.

[See our list](#) describing in more detail the most concerning toxic chemicals in food packaging, and why they should be addressed first.

Initial promising steps to limit toxic chemicals in packaging

Last year, the [Food Safety Alliance for Packaging](#) (FSAP), a part of the Institute of Packaging Professionals, released "[Food Packaging Product Stewardship Considerations](#)," a set of best practices to reduce problematic chemicals in food packaging. FSAP is supported by leading food manufacturers, including Nestle and Mars. Of our list above, FSAP said:

- Heavy metals and long-chain PFAS must not be used;
- Ortho-phthalates, BPA, and toluene should not be used;
- Ethyl and methyl glycol use should be minimized; and
- Short-chain PFAS should only be used after considering alternatives.

Start Clean

We [want](#) higher recycling rates of food packaging, and we want safer food. By ensuring future food packaging is free of these chemicals, companies can improve consumer trust while minimizing the impact of future regulations on their bottom line. In addition, the risks these chemical additives and contaminants pose when used in virgin materials continue into recycled materials; unlike the purifying processes used in recycling metal and glass, conventional plastic and paper recycling processes do not remove these persistent toxic chemicals.

We maintain that any company looking to create sustainable recycling markets for food packaging, particularly those companies developing strategies to meet the Ellen MacArthur Foundation's [New Plastics Economy Global Commitment](#), must set tight virgin-material standards to prevent problematic contamination in post-consumer recycled materials.

Taking action today helps to protect consumer health now and in the future. We will explore options and resources available to companies as part of this series. Stay tuned.

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