

School meals can contain unsafe levels of BPA, putting low-income students particularly at risk

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School meals may contain unsafe levels of bisphenol A (BPA), a chemical often found in canned goods and plastic packaging, according to research by Stanford postdoc Jennifer Hartle.

Federal standards for school meals are intended to keep kids healthy. But with emphasis solely on nutrition, schools are missing another component critical to students' health – exposure to toxic chemicals, according to a study led by Jennifer Hartle, a postdoctoral researcher at the Stanford Prevention Research Center.

School meals may contain unsafe levels of bisphenol A (BPA), a chemical often found in canned goods and plastic packaging, according to the first-of-its-kind study published in the *Journal of Exposure Science and Environmental Epidemiology*. BPA can disrupt human hormones and has been linked to health effects ranging from cancer to reproductive issues.

"During school site visits, I was shocked to see that virtually everything in school meals came from a can or plastic packaging," Hartle said. "Meat came

frozen, pre-packaged, pre-cooked and pre-seasoned. Salads were pre-cut and pre-bagged. Corn, peaches and green beans came in cans. The only items not packaged in plastic were oranges, apples and bananas."

This uptick in packaging is a result of schools' efforts to streamline food preparation and meet federal nutrition standards while keeping costs low.

Even small amounts can be toxic

The main pathway for BPA exposure is through consumption of food and drinks that have contacted the chemical. Children, whose organ systems are still developing, are especially susceptible to hormone disruption from BPA. "Sometimes only small changes in hormone activity during development can cause permanent adverse affects," the study's authors write.

Researchers track BPA intake in terms of micrograms per kilogram of [body weight](#) per day. In lab experiments, rodents experience toxicity at 2 micrograms per kilogram of body weight per day. But humans may metabolize BPA differently, Hartle said. The researchers said they believe that safe levels for BPA exposure should be in line with these low-dose toxicity findings to protect vulnerable populations like children.

To determine how much BPA students are ingesting, Hartle, along with researchers from Johns Hopkins University, interviewed school food service personnel, visited school kitchens and cafeterias in the San Francisco Bay Area and analyzed studies on BPA food concentration values. Unsurprisingly, they found that BPA exposure varies, depending on what students eat. Elementary school students consuming pizza and milk with sides of fresh fruits and vegetables would

take in minimal levels of BPA. But a student consuming pizza and milk with canned fruits and vegetables could take in anywhere from minimal levels to 1.19 micrograms of BPA per kilogram of body weight per day. While most students would not consume the maximum amount, those who do would take in more than half of the dose shown to be toxic in animal studies in just one meal.

"With endocrine-disrupting chemicals particularly, there is so much uncertainty," said Robert Lawrence, a medical doctor, one of the study's authors and director of the Johns Hopkins Center for a Livable Future. "We can't tie a specific dose to a specific response like we can with lead. But we know BPA is impacting human health. Animal models are showing there can be a whole range of health effects. This research shows we should take a precautionary approach."

Low-income children are particularly at risk of BPA exposure because they are more likely to eat federally funded meals instead of bringing lunch from home. Increasingly, students are eating not only lunch but also breakfast and sometimes dinner at school, exposing students to potentially dangerous levels of BPA.

"Even a dose of one extra microgram per day could be a big deal," Hartle said. "If this is an avoidable exposure, do we need to risk it? If we can easily cut it out, why wouldn't we?"

Inadequate regulations

In 1988, the U.S. Environmental Protection Agency defined safe BPA consumption levels as 50 micrograms or less per kilogram of body weight per day. Since then, hundreds of scientific papers have found detrimental biological effects of BPA at levels lower than the EPA standard. Recognizing the new scientific literature on BPA, the European Food Safety Authority recently updated its standards for safe BPA intake to 4 micrograms per kilogram of body weight per day – 46 micrograms less than the EPA standard.

Hartle said the United States should consider following Europe's lead by reducing its definition of safe BPA consumption levels. Another step would

be for governing agencies to invest in more low-dose toxicity testing to provide more certainty around BPA's toxicity at low levels.

Schools can protect children by limiting sources of BPA contamination. However, the researchers caution that food containers labeled "BPA-free" are not necessarily a safe alternative because the chemicals used to replace BPA could be just as toxic. Hartle suggested that parents talk to principals and school administrators about getting more fresh fruits and vegetables into cafeterias. Feeding children more fresh food in packed lunches and at home is also an important step in limiting exposure, she said.

"The bottom line is more fresh fruits and vegetables," Hartle said. "There is a movement for more fresh veggies to be included in school meals, and I think this paper supports that."

More information: "Probabilistic modeling of school meals for potential bisphenol A (BPA) exposure." *Journal of Exposure Science and Environmental Epidemiology*, (23 September 2015) | [DOI: 10.1038/jes.2015.58](https://doi.org/10.1038/jes.2015.58)

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