

BPA linked to potential adverse effects on heart and kidneys

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Exposure to a chemical once used widely in plastic bottles and still found in aluminum cans appears to be associated with a biomarker for higher risk of heart and kidney disease in children and adolescents, according to an analysis of national survey data by NYU School of Medicine researchers published in the January 9, 2013, online issue of *Kidney International*, a *Nature* publication.

Laboratory studies suggest that even low levels of bisphenol A (BPA) like the ones identified in this [national survey](#) of children and adolescents increase oxidative stress and inflammation that promotes protein leakage into the urine, which is a [biomarker](#) for early [renal impairment](#) and future risk of developing coronary heart disease, according to Leonardo Trasande, MD, MPP, associate professor of pediatrics, [environmental medicine](#), and [population health](#), and co-lead author of the study.

The study adds to the growing concerns about BPA, which was recently banned by the U.S. [Food and Drug Administration](#) but is still used as an internal coating for aluminum cans. Manufacturers say the chemical provides an antiseptic function, but studies have shown the chemical disrupts multiple mechanisms of [human metabolism](#).

"While our cross-sectional study cannot definitively confirm that BPA contributes to heart disease or [kidney dysfunction](#) in children, together with our previous study of BPA and obesity, this new data adds to already existing concerns about BPA as a contributor to [cardiovascular](#)

[risk](#) in children and adolescents," says Dr. Trasande. "It further supports the call to limit exposure of BPA in this country, especially in children," he says. "Removing it from aluminum cans is probably one of the best ways we can limit exposure. There are alternatives that manufacturers can use to line aluminum cans."

Children in the United States are exposed to the chemical early in life and surveys have shown that by age six nearly 92 percent of children have some trace of BPA in their urine. Its use has been banned in the European Union and Canada, and in the United States for use in baby bottles and sippy cups. Last September Dr. Trasande's group published a study showing a significant association between obesity and children and adolescents with higher concentrations of BPA in their urine in the *Journal of the American Medical Association*.

In the new study Dr. Trasande, Teresa Attina, MD, PhD, MPH, and Howard Trachtman, MD, of NYU School of Medicine's Department of Pediatrics, analyzed data on 710 children and adolescents aged 6 to 19 collected in a national survey to assess the health and nutritional status of adults and children in the United States. The data was from the 2009-2010 National Health and Nutrition Examination Survey (NHANES), which contained measurements on urinary BPA, and a protein called albumin, which is not normally found in urine because the spaces in the glomerular membrane of the kidney are too small to allow protein molecules to escape. If there is membrane damage as in some kidney diseases like glomerulonephritis, albumin can leak through into the urine.

The researchers controlled for risk factors such as hypertension, insulin resistance, elevated cholesterol, exposure to tobacco smoke, race/ethnicity, caregiver education, poverty to income ratio, age, weight and gender in these children. Children with the highest amount of BPA in their urine, compared to those with the lowest amount, had a higher

albumin to creatinine ratio, a potential early marker of renal impairment and future risk of developing [coronary heart disease](#), according to the study.

"While we excluded children with pre-existing kidney disease from our analysis, I am concerned that BPA exposure may have even greater effects on children with kidney disease," says Dr. Trachtman, co-lead author of the study. "Because their kidneys are already working harder to compensate and have limited functional reserve, they may be more susceptible to the adverse effects of environmental toxins. We clearly need further study of [BPA](#) exposure and its effects on the kidney both in healthy children and in children who have pre-existing kidney disease."

The researchers concluded their analysis by emphasizing the need for further research on environmental chemicals and cardiovascular disease, noting that further study may well transform our understanding "from one that focuses on dietary risks to an approach that recognizes the role of environmental chemical factors that may independently impart the risk of ... future cardiovascular disease."

Provided by New York University School of Medicine

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