

URINARY BISPHENOL-A AND HEMOGLOBIN A1C LEVELS IN U.S. ADULTS USING DATA FROM NHANES 2003/08

Monica K. Silver, *Department of Environmental Health Sciences, School of Public Health, University of Michigan, Ann Arbor, MI, USA*

Marie S. O'Neill, *Departments of Epidemiology and Environmental Health Sciences, School of Public Health, University of Michigan, Ann Arbor, MI, USA*

Sung Kyun Park, *Departments of Epidemiology and Environmental Health Sciences, School of Public Health, University of Michigan, Ann Arbor, MI, USA*

Background: Bisphenol A (BPA) is a ubiquitous environmental contaminant. Low dose negative effects of BPA have been demonstrated in many organ systems, especially as an endocrine disruptor. BPA exposure may lead to insulin resistance and development of type-2 diabetes through its over-activation of the insulin-producing pancreatic β - cells. Previous epidemiological studies have linked urinary BPA and type-2 diabetes.

Methods: We examined 4,389 adults who participated in the National Health and Nutrition Examination Survey (NHANES) from 2003 to 2008 to further explore the association between BPA exposure and type-2 diabetes. We investigated if higher urinary BPA was associated with higher hemoglobin A1c (HbA1c), a biological measure of the glycemic index, using survey-weighted generalized linear models.

Results: For the total sample of 4,389, log-transformed urinary BPA levels were highly associated with HbA1c (β estimate= 0.034% (95% confidence interval (CI), 0.002% to 0.066%) for an interquartile range increase in log(BPA), 1.41 ng/mL), after controlling for age, sex, race/ethnicity, education, household income, smoking, body mass index, waist circumference, and urine creatinine concentrations. However, such a significant association was found only in the 2003/04 cycle of NHANES (n=1,364) (β =0.097% (95% CI, 0.040% to 0.154%)). No association was found in NHANES 2005/06 or 2007/08. The observed significant association in NHANES 2003/04 seems to be driven by a larger significant association among participants who were taking diabetes medication (n=119, weighted percentage=6%, β =0.324% (95% CI, 0.055% to 0.592%)); for non-medication-users (n=1,245, weighted percentage=94%, β =0.003% (95% CI, -0.042% to 0.047%)).

Conclusions: Although we found a significant association between higher urinary BPA and elevated HbA1c in a pooled analysis, this was driven by data from only one NHANES cycle. Additional studies, especially with a longitudinal design, are needed to further elucidate the association between BPA and HbA1c and type-2 diabetes.