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## **Environment-Wide Association Study on Chronic Kidney Disease in the National Health and Nutrition Examination Survey (1999–2016)**

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**Objectives:** Exposure to environmental chemicals has increased incrementally. However, adverse effects of environmental chemicals on the development of CKD are not well-investigated. We aimed to investigate which environmental chemicals are significantly associated with the development of CKD.

**Methods:** Population-based cohort study. A total of 53,348 adult aged above 18 years old participants, who participated in the NHANES surveys over 18 years, were enrolled. The association between environmental chemicals and CKD was tested and validated using the environmental-wide association study (EWAS) methodology. CKD was defined as three categories. First, urinary albumin to creatinine ratio above 30 mg/g was defined as CKD. Second definition was glomerular filtration rate (GFR) below 60 ml/min/1.73m<sup>2</sup>. And the last is the composite category CKD of albuminuria and GFR. Urinary albumin to creatinine ratio above 30 mg/g or GFR below 60 ml/min/1.73m<sup>2</sup> was defined as CKD.

**Results:** A total of 299 environmental toxins were included in the analysis. Blood lead, urinary antimony and cobalt, blood 1,2-Dichlorobenzene and nitrobenzene were positively associated with CKD defined by albuminuria. In the contrary, perfluorooctanoic acid, perfluorooctane sulfonic acid, urinary nitrate and thiocyanate were negatively associated with CKD defined by albuminuria. Blood lead and cadmium showed positive association with CKD defined by GFR. Other 31 significant environmental factors were all negatively associated with CKD defined by GFR. Blood lead, urinary tungsten, blood 1,2-dichlorobenzene and nitrobenzene, 2,4,5-trichlorophenol, mono-n-butyl phthalate, mono-benzyl phthalate were positively associated with CKD defined both albuminuria and GFR. Urinary mono-benzyl phthalate is associated with increased prevalence of CKD in various categories of albuminuria and GFR.

**Conclusions:** Urinary mono-benzyl phthalate as well as blood lead are consistently associated with CKD defined by various range of albuminuria, glomerular filtration rate, and composite categories. Increased exposure to lead or mono-benzyl phthalate can be associated with increased prevalence of CKD.