

# Study finds high blood and urinary metal levels among exclusive marijuana users

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Research conducted at Columbia University Mailman School of Public

Health detected significant levels of metals in the blood and urine among marijuana users, concluding that marijuana may be an important and under-recognized source of lead and cadmium exposure.

This is among the first studies to report biomarker [metal](#) levels among [marijuana users](#) and most likely the largest study to date, that links self-reported [marijuana](#) use to internal measures of metal exposure, rather than just looking at metal levels in the cannabis plant. The results are published online in the journal *Environmental Health Perspectives*,

Measurements reported by participants for exclusive marijuana use compared to non-marijuana tobacco had significantly higher lead levels in blood (1.27 ug/dL) and urine (1.21 ug/g creatinine).

"Because the [cannabis plant](#) is a known scavenger of metals, we had hypothesized that individuals who use marijuana will have higher metal biomarker levels compared to those who do not use," said Katelyn McGraw, postdoctoral researcher in Columbia Public Health's Department of Environmental Health Sciences, and the first author. "Our results therefore indicate marijuana is a source of cadmium and lead exposure."

The researchers combined data from the National Health and Nutrition Examination Survey for the years 2005–2018. Led by the National Center for Health Statistics (NCHS) at the CDC, NCHS NHANES is a biannual program of studies designed to assess the health and nutritional status of adults and children in the U. S.

McGraw and colleagues classified the 7,254 survey participants by use: non-marijuana/non-tobacco, exclusive marijuana, exclusive tobacco, and dual marijuana and tobacco use. Five metals were measured in the blood and 16 in urine.

The researchers used four NHANES variables to define exclusive marijuana and tobacco use: current cigarette smoking, serum cotinine levels, self-reported ever marijuana use, and recent marijuana use. Exclusive [tobacco use](#) was defined as individuals who either answered yes to 'do you now smoke cigarettes, or if individuals had a serum cotinine level >10ng/mL.

Marijuana is the third most commonly used drug in the world behind tobacco and alcohol. As of 2022, 21 states and Washington D.C., covering more than 50% of the U.S. population, have legalized recreational use of marijuana; and [medical marijuana](#) is legal in 38 states and Washington D.C.

However, because marijuana is still illegal at the federal level, regulation of contaminants in all cannabis-containing products remains piecemeal and there has been no guidance from federal regulatory agencies like the FDA or EPA. As of 2019, 48.2 million people, or 18% of Americans, report using marijuana at least once in the last year.

While 28 states regulate [inorganic arsenic](#), cadmium, lead, and total mercury concentrations in marijuana products, regulation limits vary by metal and by state.

"Going forward, research on cannabis use and cannabis contaminants, particularly metals, should be conducted to address public health concerns related to the growing number of cannabis users," said Tiffany R. Sanchez, Ph.D., assistant professor of environmental health sciences at Columbia Public Health, and senior author.

Co-authors are Anne E. Nigra, Joshua Klett, Marisa Sobel, and Ana Navas-Acien, Columbia Public Health; Elizabeth C. Oelsner, Columbia University Irving Medical Center; and Xin Hu, Emory University School of Medicine.

**More information:** Blood and Urinary Metal Levels among Exclusive Marijuana Users in NHANES (2005–2018), *Environmental Health Perspectives* (2023). [DOI: 10.1289/EHP12074](https://doi.org/10.1289/EHP12074)

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