Environ Health Perspect

DOI: 10.1289/EHP12074

Supplemental Material

Blood and Urinary Metal Levels among Exclusive Marijuana Users in NHANES (2005–2018)

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Additional File- Excel Document

Figure S1. Flow chart of NHANES 2005-2018 participants and exclusion criteria.

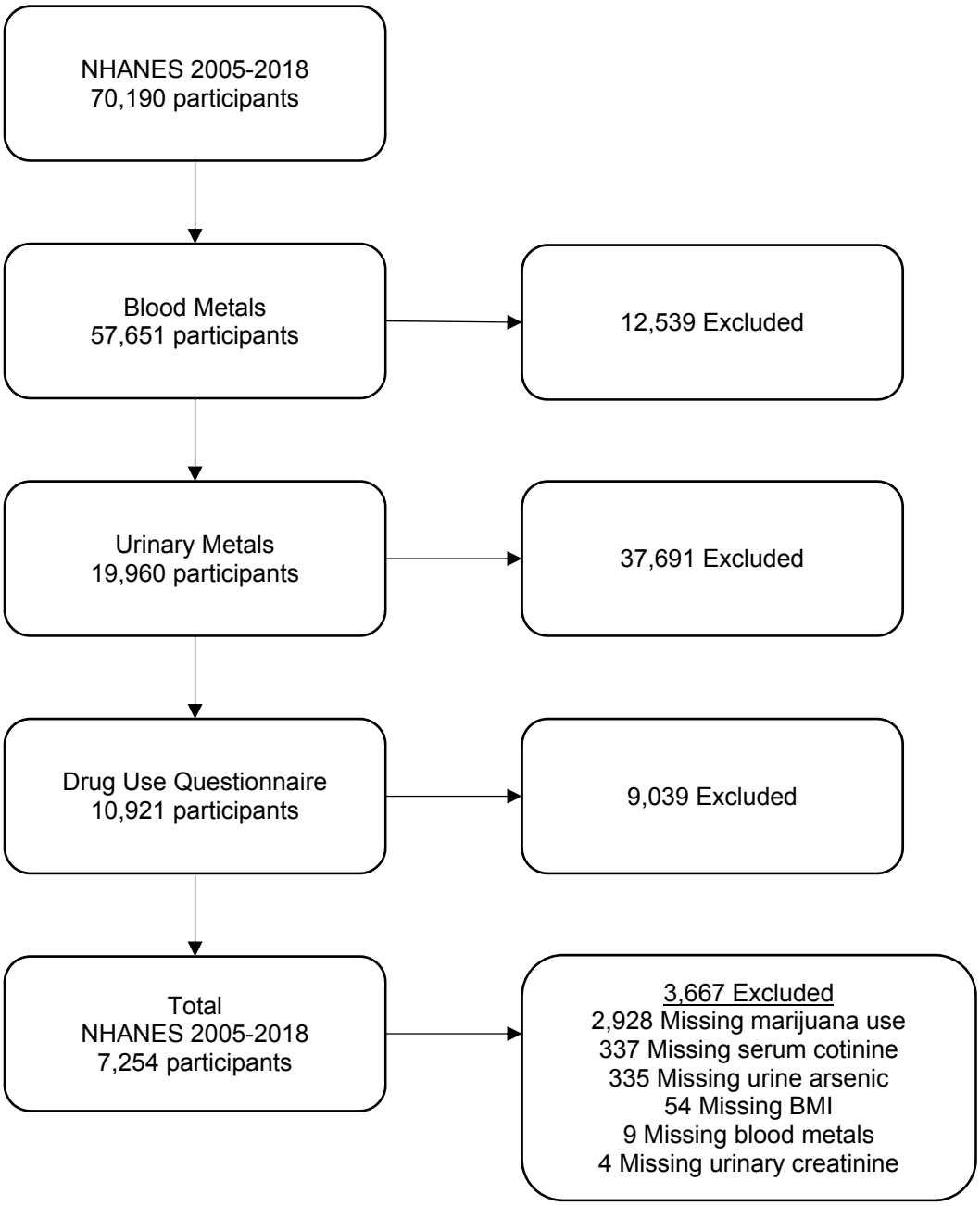


Table S1. Blood (LBX prefix) and urinary (URX prefix) metal data availability by NHANES cycle year. Seven cycles were included in our data analysis. Grey boxes indicate that metal biomarker was not collected for that cycle year and x indicates that metal biomarker was collected.

Variable	Metal	2005	2007	2009	2011	2013	2015	2017
LBXBCD	Cadmium	x	x	x	x	x	x	x
LBXBPB	Lead	x	x	x	x	x	x	x
LBXTHG	Mercury	x	x	x	x	x	x	x
LBXBMN	Manganese				x	x	x	x
LBXBSE	Selenium				x	x	x	x
URXUAS	Total Arsenic	x	x	x	x	x	x	x
URXUAB	Arsenobetaine	x	x	x	x	x	x	x
URXUDMA	DMA	x	x	x	x	x	x	x
URXUSB	Antimony	x	x	x	x	x	x	x
URXUBA	Barium	x	x	x	x	x	x	x
URXUBE	Beryllium	x	x	x				
URXUCD	Cadmium	x	x	x	x	x	x	x
URXUCS	Cesium	x	x	x	x	x	x	x
URXUPB	Lead	x	x	x	x	x	x	x
URXUPT	Platinum	x	x	x				
URXUSR	Strontium				x	x	x	
URXUTL	Thallium	x	x	x	x	x	x	x
URXUSN	Tin				x	x	x	x
URXUTU	Tungsten	x	x	x	x	x	x	x
URXUUR	Uranium	x	x	x	x	x	x	
URXUCO	Cobalt	x	x	x	x	x	x	x
URXUMN	Manganese				x	x	x	x
URXUMO	Molybdenum	x	x	x	x	x	x	x

* LBX indicates blood biomarker and URX prefix indicates urinary biomarker of exposure.

Table S2. Lower limit of detection (LLOD) values and % below limit of detection (LOD) for metal biomarkers in blood (LBX prefix) and urine (URX prefix) by NHANES cycle year. Metal biomarkers were reported in µg/L in urine and whole blood, except for lead in whole blood which is reported in µg/dL. Grayed out lines indicate metal biomarkers not measured in that cyle.

Variable	Metal	LLOD[a] 2005	LLOD[a] 2007	LLOD[a] 2009	LLOD 2011	LLOD 2013	LLOD 2015	LLOD 2017	%Below LOD
LBXBCD	Cadmium				0.16	0.10	0.10	0.10	12%
LBXBPB	Lead				0.25[b]	0.07	0.07	0.07	0%
LBXTHG	Mercury				0.16	0.28	0.28	0.28	12%
LBXBMN	Manganese				1.06	0.99	0.99	0.99	0%
LBXBSE	Selenium				30.0	24.48	24.48	24.48	0%
URXUAS	Total Arsenic	0.74	0.74	0.74	1.25	0.26	0.26	0.23	1%
URXUAB	Arsenobetaine	0.4	0.4	0.4	1.19	1.16	1.16	1.16	45%
URXUDMA	DMA	1.7	1.7	1.7	1.8	1.91	1.91	1.91	21%
URXUSB	Antimony			0.032	0.041	0.022	0.022	0.022	25%
URXUBA	Barium			0.12	0.1	0.06	0.06	0.06	1%
URXUBE	Beryllium			0.072					100%
URXUCD	Cadmium			0.042	0.056	0.036	0.036	0.036	7%
URXUCS	Cesium			0.066	0.12		0.023	0.023	0%
URXUPB	Lead			0.1	0.08	0.03	0.03	0.03	2%
URXUPT	Platinum			0.009					91%
URXUSN	Tin				2.5	2.34	2.34		11%
URXUSR	Strontium			0.015	0.02	0.018	0.018	0.018	0%
URXUTL	Thallium				0.22	0.09	0.09	0.09	0%
URXUTU	Tungsten			0.021	0.026	0.018	0.018	0.018	14%
URXUUR	Uranium			0.0017	0.0033	0.002	0.002		16%
URXUCO	Cobalt			0.041	0.048	0.023	0.086	0.086	0%
URXUMN	Manganese			0.92	0.99	0.8	0.8	0.8	61%
URXUMO	Molybdenum				0.08	0.13	0.13	0.13	0%

[a] LLOD = Lower limit of detection; LLODs not provided metal biomarkers at NHANES website for years 2005, 2007, and 2009

[b] Lead measured in whole blood was reported as µg/dL

Table S3. Self-reported cigarette smoking and serum cotinine values (ng/mL) in a 2x2 table.

	≤10ng/mL Cotinine	**>10ng/mL Cotinine**
Self-Report Non-Smoker	5,024	462
Self-Report Smoker	0	1,745

Table S4. Marijuana and tobacco use categories and recent use categories in a 2x2 table.

Last used marijuana: [a]		**≤7 days** [b]	**8-30 days** [c]	**31-365 days** [d]
Non-Marijuana/Non-Tobacco	4455	0	0	211
Marijuana Only	358	226	132	0
Tobacco Only	1511	0	0	0
Dual Marijuana and Tobacco Use	719	0	0	0

[a] 'Last time used marijuana' (DUQ220Q), and the unit of time at which the individual last used marijuana in days, months, weeks, or years (DUQ220U) were used to classify individuals by recent use.
[b] Individuals who report using marijuana in the last 7 days (N=226).
[c] Individuals who report using marijuana in the last 8-30 days (N=132).
[d] Individuals who report using marijuana in the last 31-365 (n=719).

Table S5. Participant characteristics across categories of recent marijuana use, restricted to participants with available drug use questionnaire data and urinary metals (n=5,024). Self-reported cigarette smokers and individuals with serum cotinine >10ng/mL were excluded. Continuous variables are reported as mean (SD) and categorical variables as number (%).

	Non-Marijuana Use [a]	**≤7 days** [b]	**8-30 days** [c]	**31-365 days** [d]
n	4455	226	132	211
Age	40.4 (11.7)	35.8 (12.4)	33.2 (11.5)	31.5 (11.9)
Sex, N (%)				
Female	2535 (55.7)	102 (42.3)	66 (41.8)	106 (48.0)
Male	1920 (44.3)	124 (57.7)	66 (58.2)	105 (52.0)
Race and Ethnicity, N (%)				
Mexican American	977 (12.3)	30 (6.3)	19 (9.0)	40 (10.0)
Other Hispanic	515 (7.3)	20 (4.8)	16 (7.4)	23 (5.9)
Non-Hispanic White	1544 (61.7)	110 (75.5)	43 (60.4)	89 (69.2)
Non-Hispanic Black	819 (10.5)	43 (9.1)	40 (16.0)	44 (9.4)
Other Race, incl Multi	600 (8.2)	23 (4.4)	14 (7.2)	15 (5.5)
Education, N (%)				
Less than HS Diploma	822 (11.5)	19 (6.9)	9 (4.9)	17 (8.5)
High School Grad/GED [e]	797 (18.2)	38 (17.0)	26 (25.2)	34 (15.1)
More than HS Diploma	2703 (70.3)	151 (76.2)	84 (69.8)	129 (76.4)
Income, N (%)				
$0-$24,999	838 (14.3)	43 (13.9)	31 (20.5)	52 (15.8)
$25,000-$54,999	1360 (29.7)	72 (33.2)	40 (26.8)	59 (28.5)
$55,000-$74,999	570 (15.0)	26 (10.7)	13 (7.8)	28 (11.1)
$75,000-$100,000 or more	1300 (40.9)	70 (42.2)	42 (45.0)	61 (44.7)
BMI (kg/m^2)	29.4 (7.1)	28.4 (6.4)	28.9 (7.1)	27.8 (6.9)
Serum Cotinine (ng/mL)	0.2 (0.7)	0.9 (1.8)	0.6 (1.5)	0.5 (1.4)
Ever Smoker, N (%) [f]				
Yes	893 (22.4)	79 (42.3)	35 (36.3)	49 (25.6)
No	3562 (77.6)	147 (57.7)	97 (63.7)	162 (74.4)
Ever Marijuana Use, N (%) [g]				
Yes	1605 (44.1)	226 (100.0)	132 (100.0)	211 (100.0)
No	2850 (55.9)	0 (0.0)	0 (0.0)	0 (0.0)
Creatinine (mg/dL)	116.5 (76.7)	132.0 (77.4)	132.8 (74.5)	131.6 (84.1)
eGFR (mL/min/1.73 m^2) [h]	100.6 (19.0)	104.6 (17.4)	107.9 (18.9)	108.1 (17.4)

Analyses conducted using 'survey' package to account for NHANES complex sampling design and weights; percentages are weighted and indicate population percentages.
Continuous variables are reported as mean (SD) and categorical variables as number (population weighted %).
[a] The reference group of non-marijuana use includes individuals who have not used marijuana in the last 365 days (N=4,455).
[b] Individuals who report using marijuana in the last 7 days (N=226).
[c] Individuals who report using marijuana in the last 8-30 days (N=132).
[d] Individuals who report using marijuana in the last 31-365 (n=719).

[e] General Education Development; US high school diploma alternative
[f] Ever smoker is participants who self-report smoking at least 100 cigarettes in their lifetime
[g] Ever marijuana use is participants who self-report having ever used marijuana or hashish
[h] Estimated glomerular filtration rate

Table S6. Urinary metal concentrations (µg/g creatinine) by recent use, reported as median [IQR]. Metal levels measured in urine (µg/g) and in blood (µg/L or µg/dL for Pb), N= 5,024 NHANES 2005-2018 participants. The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age.

Metal	Non-Marijuana Use [a]	≤7 days [b]	8-30 days [c]	31-365 days [d]
n	4455	226	132	211
Cadmium	0.220 [0.140, 0.320]	0.220 [0.140, 0.314]	0.216 [0.140, 0.320]	0.180 [0.140, 0.240]
Lead	0.82 [0.55, 1.30]	0.88 [0.59, 1.34]	0.76 [0.49, 1.11]	0.76 [0.50, 1.12]
Mercury	0.860 [0.440, 1.630]	0.980 [0.500, 2.176]	0.953 [0.443, 2.396]	0.906 [0.475, 1.645]
Manganese	9.45 [7.55, 11.72]	8.83 [7.40, 10.46]	8.55 [7.27, 11.15]	8.86 [7.18, 10.99]
Selenium	194.2 [178.9, 208.3]	197.1 [180.2, 213.5]	195.6 [183.9, 210.6]	192.2 [176.8, 206.2]
Total arsenic†	102.0 [56.0, 162.0]	125.0 [74.0, 178.7]	125.4 [67.2, 177.2]	114.7 [68.0, 176.1]
DMA†	3.84 [2.51, 6.14]	3.45 [2.36, 5.45]	3.18 [2.39, 4.83]	3.52 [2.46, 5.36]
Antimony	2.63 [1.68, 4.23]	2.54 [1.52, 3.74]	2.10 [1.53, 3.70]	2.42 [1.65, 4.25]
Barium	0.049 [0.034, 0.078]	0.044 [0.028, 0.067]	0.051 [0.033, 0.076]	0.044 [0.032, 0.063]
Cadmium	1.32 [0.75, 2.31]	1.12 [0.79, 2.04]	1.33 [0.79, 2.21]	1.23 [0.79, 2.46]
Cesium	0.37 [0.25, 0.55]	0.31 [0.22, 0.50]	0.34 [0.23, 0.47]	0.32 [0.22, 0.46]
Lead	4.37 [3.23, 6.03]	4.14 [3.31, 5.69]	3.60 [2.83, 5.46]	3.91 [2.94, 4.99]
Strontium	38.7 [26.5, 56.9]	36.1 [27.3, 47.9]	35.9 [21.3, 47.5]	38.4 [25.0, 57.9]
Thallium	0.41 [0.23, 0.78]	0.36 [0.17, 0.71]	0.31 [0.16, 0.55]	0.39 [0.20, 0.81]
Tin	97.4 [62.3, 145.3]	105.0 [62.6, 148.8]	88.7 [60.4, 121.0]	85.9 [57.9, 138.1]
Tungsten	0.16 [0.12, 0.23]	0.18 [0.12, 0.24]	0.14 [0.10, 0.21]	0.16 [0.12, 0.22]
Uranium	0.06 [0.04, 0.12]	0.07 [0.04, 0.11]	0.06 [0.04, 0.10]	0.06 [0.04, 0.11]
Cobalt	0.16 [0.09, 0.26]	0.13 [0.08, 0.22]	0.13 [0.07, 0.18]	0.10 [0.06, 0.16]
Manganese	0.33 [0.21, 0.54]	0.31 [0.17, 0.53]	0.27 [0.17, 0.39]	0.28 [0.17, 0.43]
Molybdenum	0.13 [0.07, 0.22]	0.10 [0.06, 0.15]	0.13 [0.07, 0.17]	0.10 [0.06, 0.20]

Analyses conducted using 'survey' package to account for NHANES complex sampling design and weights; percentages are weighted and indicate population percentages.
Continuous variables are reported as median [IQR] and categorical variables as number (population weighted %).
[a] The reference group of non-marijuana use includes individuals who have not used marijuana in the last 365 days (N=4,455).
[b] Individuals who report using marijuana in the last 7 days (N=226).
[c] Individuals who report using marijuana in the last 8-30 days (N=132).
[d] Individuals who report using marijuana in the last 31-365 (n=719).

Table S7. Arithmetic mean differences and 95%CIs in blood metal concentrations (μg/L or μg/dL for Pb) across different marijuana use categories as compared to non-marijuana/non-tobacco use (reference), N= 7,254 NHANES 2005-2018 participants, corresponding to Figure 1 in the manuscript.

Model	Use	Estimate	Lower 95% CI	Upper 95% CI	P-Value
Cd	Exclusive Marijuana	1.221148	1.110654	1.342634	0.0001
Cd	Exclusive Tobacco	3.956966	3.739772	4.186774	0.0000
Cd	Dual Use	4.45819	4.096433	4.851894	0.0000
Pb (μg/dL)	Exclusive Marijuana	1.266402	1.071056	1.497377	0.0062
Pb (μg/dL)	Exclusive Tobacco	1.335429	1.247734	1.429288	0.0000
Pb (μg/dL)	Dual Use	1.641873	1.444178	1.86663	0.0000
Hg	Exclusive Marijuana	1.336262	1.031663	1.730795	0.0285
Hg	Exclusive Tobacco	0.859764	0.76855	0.961804	0.0088
Hg	Dual Use	0.830544	0.716853	0.962265	0.0140
Mn	Exclusive Marijuana	0.960892	0.909547	1.015137	0.1507
Mn	Exclusive Tobacco	0.991547	0.958755	1.025461	0.6143
Mn	Dual Use	0.982298	0.927761	1.040041	0.5327
Se	Exclusive Marijuana	1.015613	0.993563	1.038153	0.1624
Se	Exclusive Tobacco	0.997281	0.981779	1.013028	0.7284
Se	Dual Use	0.987243	0.969403	1.005412	0.1635

Table S8. Arithmetic mean differences and 95%CIs in urinary metal levels (µg/g) across different marijuana use as compared to non-marijuana/non-tobacco use (reference), N= 7,254 NHANES 2005-2018 participants, corresponding to Figure 2 in the manuscript.

Model	Use	Estimate	Lower 95% CI	Upper 95% CI	P-Value
tAs	Exclusive Marijuana	0.993993	0.910775	1.084815	0.8915
tAs	Exclusive Tobacco	0.978412	0.919448	1.041157	0.4875
tAs	Dual Use	1.028427	0.941943	1.122852	0.5280
DMA	Exclusive Marijuana	0.964885	0.87806	1.060295	0.4536
DMA	Exclusive Tobacco	0.971701	0.917296	1.029333	0.3252
DMA	Dual Use	1.003257	0.910858	1.105029	0.9469
Sb	Exclusive Marijuana	0.990186	0.826062	1.186917	0.9142
Sb	Exclusive Tobacco	1.149324	1.000211	1.320667	0.0497
Sb	Dual Use	1.040307	0.932989	1.159969	0.4730
Ba	Exclusive Marijuana	1.081395	0.846136	1.382064	0.5281
Ba	Exclusive Tobacco	1.187363	1.058945	1.331355	0.0037
Ba	Dual Use	1.047455	0.907382	1.209152	0.5230
Cd	Exclusive Marijuana	1.178763	1.056842	1.31475	0.0035
Cd	Exclusive Tobacco	1.754735	1.639846	1.877672	0.0000
Cd	Dual Use	1.689364	1.555301	1.834982	0.0000
Cs	Exclusive Marijuana	1.018079	0.945022	1.096785	0.6340
Cs	Exclusive Tobacco	0.988507	0.934984	1.045092	0.6811
Cs	Dual Use	0.957991	0.890806	1.030245	0.2443
Pb	Exclusive Marijuana	1.210564	0.993655	1.474823	0.0577
Pb	Exclusive Tobacco	1.25763	1.134158	1.394545	0.0000
Pb	Dual Use	1.539171	1.312813	1.804558	0.0000
Sr	Exclusive Marijuana	1.020231	0.852373	1.221145	0.8222
Sr	Exclusive Tobacco	1.1005	0.977903	1.238466	0.1086
Sr	Dual Use	1.055074	0.923941	1.204818	0.4174
Tl	Exclusive Marijuana	1.026751	0.949593	1.110179	0.5040
Tl	Exclusive Tobacco	0.906384	0.860186	0.955064	0.0003
Tl	Dual Use	0.930574	0.874187	0.990598	0.0245
Sn	Exclusive Marijuana	1.144832	0.716799	1.828461	0.5642
Sn	Exclusive Tobacco	1.129974	0.898198	1.421558	0.2900
Sn	Dual Use	1.222011	0.873119	1.710317	0.2365
W	Exclusive Marijuana	1.194417	0.844875	1.688572	0.3110
W	Exclusive Tobacco	1.106118	0.98056	1.247752	0.0999
W	Dual Use	1.105584	0.93909	1.301596	0.2252
U	Exclusive Marijuana	0.999074	0.816931	1.221828	0.9927
U	Exclusive Tobacco	1.531998	1.197576	1.959806	0.0009
U	Dual Use	1.524833	1.210723	1.920435	0.0005
Co	Exclusive Marijuana	0.937605	0.847619	1.037145	0.2081
Co	Exclusive Tobacco	0.985612	0.900624	1.078619	0.7504
Co	Dual Use	0.981127	0.91729	1.049407	0.5753
Mn	Exclusive Marijuana	1.080828	0.67072	1.741694	0.7448
Mn	Exclusive Tobacco	1.003472	0.848799	1.18633	0.9670
Mn	Dual Use	0.968085	0.735126	1.274867	0.8138
Mo	Exclusive Marijuana	0.919959	0.858457	0.985867	0.0186
Mo	Exclusive Tobacco	0.879606	0.832566	0.929303	0.0000
Mo	Dual Use	0.878572	0.812705	0.949777	0.0014

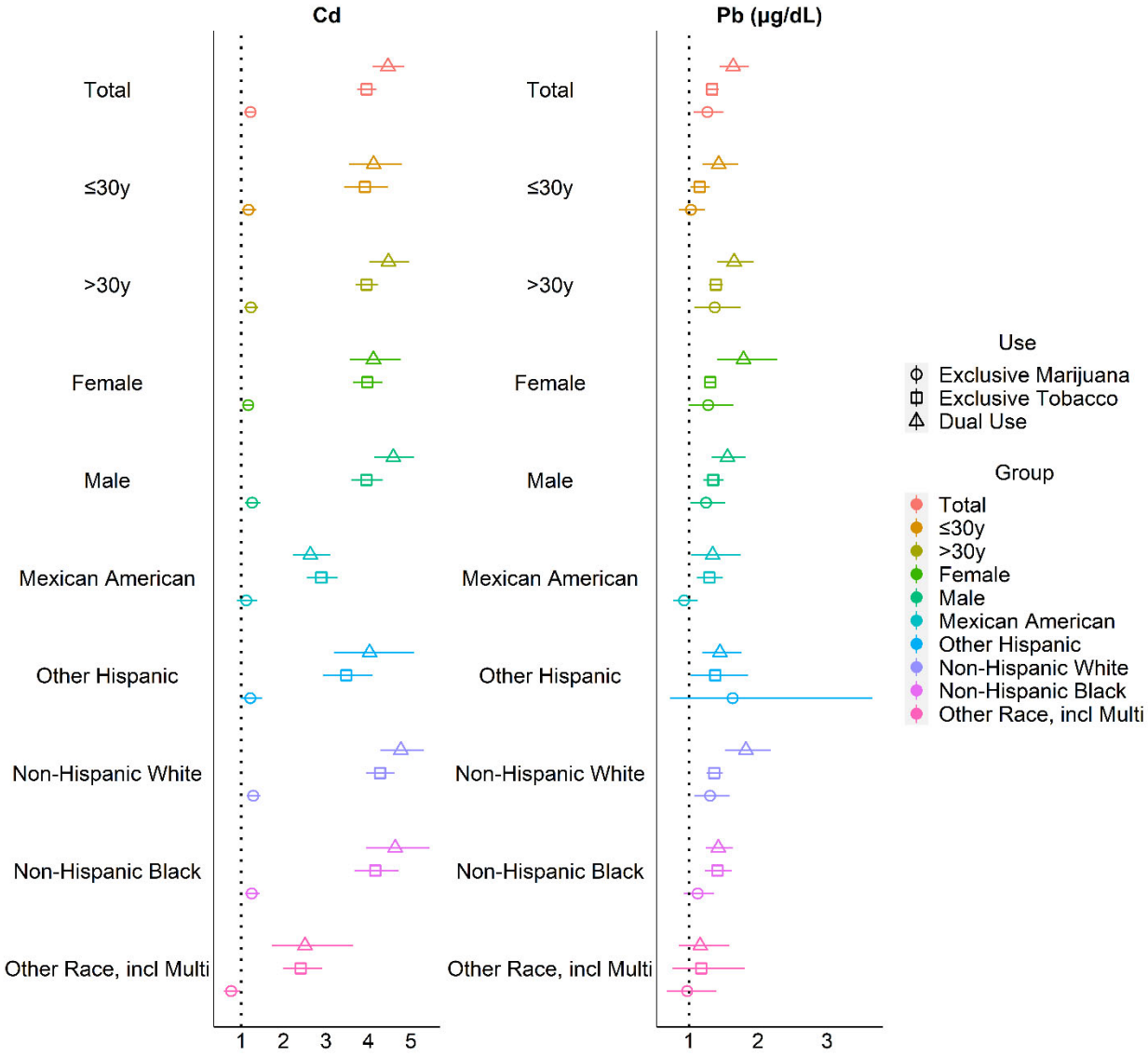
Table S9. Arithmetic mean differences and 95%CIs in blood metal concentrations (µg/L or µg/dL for Pb) in individuals who recently used marijuana as compared to individuals who do not use or had not used in more than one year (reference), N= 5,024 NHANES 2005-2018 participants, corresponding values for Figure 3 in the manuscript.

Model	Recent Use	Estimate	Lower 95% CI	Upper 95% CI	P-Value
Cd	≤7 days	1.230253	1.118836	1.352764	0.0000
Cd	>7 days ≤30	1.261494	1.057604	1.504691	0.0103
Cd	>30 days ≤365	1.035489	0.944375	1.135393	0.4542
Pb (µg/dL)	≤7 days	1.394198	1.111265	1.749167	0.0045
Pb (µg/dL)	>7 days ≤30	1.067287	0.937563	1.21496	0.3211
Pb (µg/dL)	>30 days ≤365	1.166665	1.027935	1.324119	0.0175
Hg	≤7 days	1.395728	1.055088	1.846344	0.0200
Hg	>7 days ≤30	1.378149	0.990553	1.91741	0.0568
Hg	>30 days ≤365	1.058687	0.879684	1.274115	0.5425
Mn	≤7 days	0.971986	0.915018	1.032501	0.3491
Mn	>7 days ≤30	0.93665	0.846267	1.036686	0.2010
Mn	>30 days ≤365	0.929954	0.855983	1.010316	0.0845
Se	≤7 days	1.016052	0.983987	1.049161	0.3232
Se	>7 days ≤30	1.015332	0.992551	1.038636	0.1840
Se	>30 days ≤365	0.984497	0.951284	1.018869	0.3647

Table S10. Arithmetic mean differences and 95%CIs in urinary metal levels (µg/g) in individuals who recently used marijuana as compared to individuals who do not use or had not used in more than one year (reference), N= 5,024 NHANES 2005-2018 participants, corresponding values for Figure 4 in the manuscript.

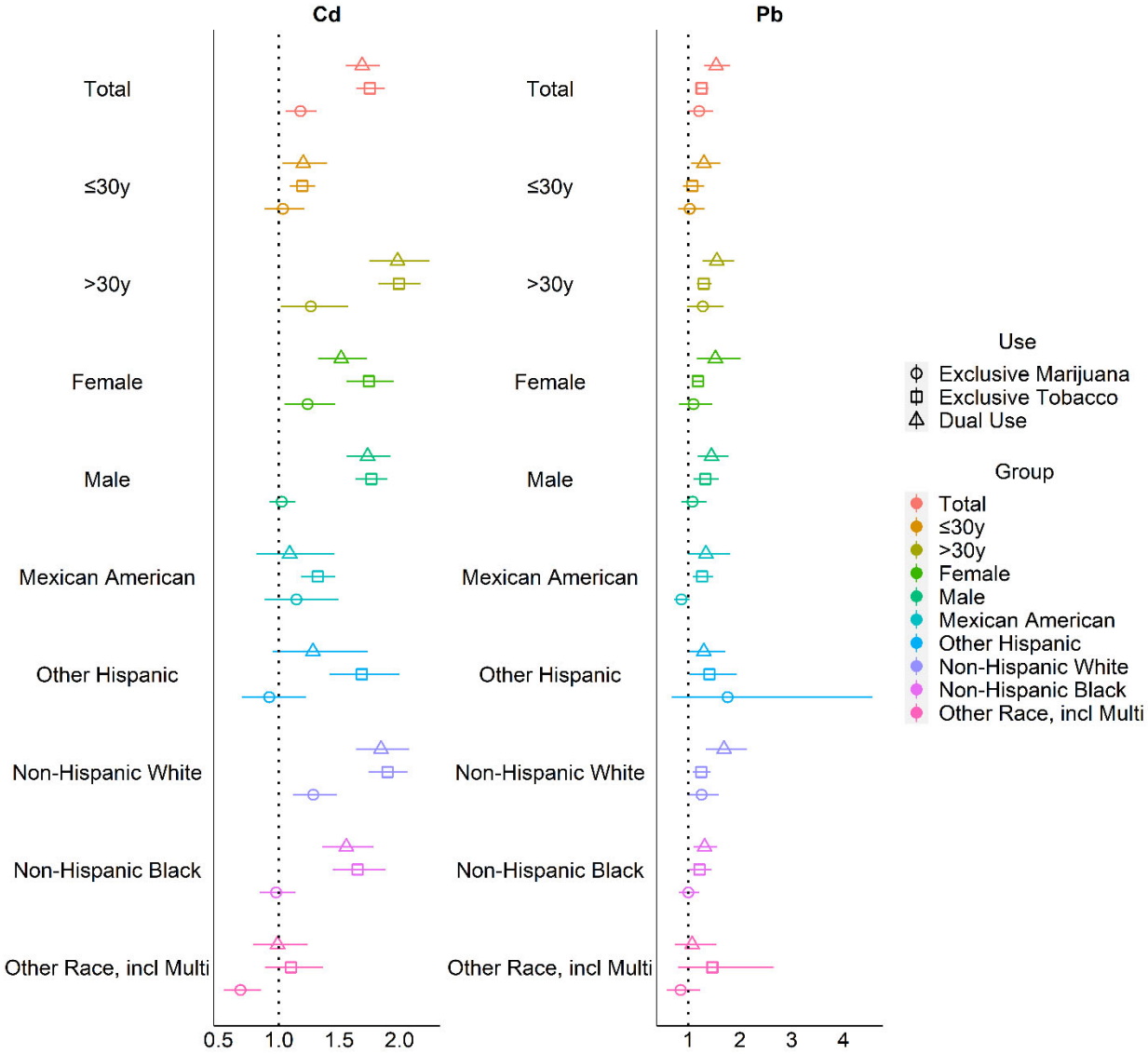
Model	Recent Use	Estimate	Lower 95% CI	Upper 95% CI	P-Value
tAs	≤7 days	1.011433	0.907587	1.127162	0.835435
tAs	>7 days ≤30	0.980442	0.858223	1.120066	0.769022
tAs	>30 days ≤365	1.146485	0.942997	1.393885	0.168128
DMA	≤7 days	0.985057	0.876782	1.106704	0.797997
DMA	>7 days ≤30	0.938605	0.826537	1.065867	0.325077
DMA	>30 days ≤365	1.087034	0.924646	1.277941	0.308488
Sb	≤7 days	0.900399	0.725153	1.117998	0.338403
Sb	>7 days ≤30	1.140828	0.826425	1.574841	0.419259
Sb	>30 days ≤365	0.808658	0.685802	0.953523	0.012084
Ba	≤7 days	0.949692	0.8301	1.086514	0.448365
Ba	>7 days ≤30	1.455338	0.886788	2.388404	0.135979
Ba	>30 days ≤365	1.139658	0.929694	1.39704	0.205617
Cd	≤7 days	1.195257	1.030613	1.386203	0.018857
Cd	>7 days ≤30	1.110052	0.946076	1.30245	0.197881
Cd	>30 days ≤365	0.953914	0.832534	1.092991	0.493029
Cs	≤7 days	1.026723	0.942379	1.118616	0.542844
Cs	>7 days ≤30	0.979871	0.867575	1.106704	0.740912
Cs	>30 days ≤365	0.959729	0.879925	1.04677	0.349657
Pb	≤7 days	1.307877	1.005844	1.700603	0.045223
Pb	>7 days ≤30	1.029944	0.859906	1.233604	0.746209
Pb	>30 days ≤365	1.049483	0.890337	1.237076	0.561286
Sr	≤7 days	1.070496	0.862842	1.328125	0.525191
Sr	>7 days ≤30	0.909233	0.744206	1.110856	0.34111
Sr	>30 days ≤365	0.941125	0.787462	1.124774	0.493781
Tl	≤7 days	1.070118	0.968848	1.181973	0.179204
Tl	>7 days ≤30	0.948715	0.825906	1.089784	0.452784
Tl	>30 days ≤365	0.920817	0.842535	1.006373	0.068406
Sn	≤7 days	1.40704	0.825427	2.398471	0.204249
Sn	>7 days ≤30	0.843883	0.579992	1.227844	0.367477
Sn	>30 days ≤365	1.29011	0.739243	2.25147	0.362464
W	≤7 days	1.067596	0.852351	1.337199	0.565542
W	>7 days ≤30	1.471753	0.713586	3.035453	0.291951
W	>30 days ≤365	1.156597	0.711416	1.880358	0.553763
U	≤7 days	0.812443	0.68413	0.964823	0.018491
U	>7 days ≤30	1.445318	1.006127	2.076223	0.046347
U	>30 days ≤365	0.860227	0.673724	1.098359	0.223812
Co	≤7 days	0.913069	0.804066	1.036849	0.158853
Co	>7 days ≤30	0.971957	0.875617	1.078896	0.589825
Co	>30 days ≤365	0.877489	0.779316	0.98803	0.031214
Mn	≤7 days	0.717935	0.550598	0.936129	0.015449
Mn	>7 days ≤30	1.755628	0.851955	3.617834	0.12419
Mn	>30 days ≤365	0.861615	0.668229	1.110966	0.244641
Mo	≤7 days	0.937687	0.870519	1.010037	0.088973
Mo	>7 days ≤30	0.911056	0.803906	1.032487	0.142739
Mo	>30 days ≤365	0.996417	0.878968	1.129561	0.954819

Figure S2. Mean differences and 95%CIs in blood metal concentrations (µg/L or µg/dL for Pb) across different marijuana use groups analyzed by subgroup of age, sex, and race, N= 7,254 NHANES 2005-2018 participants.



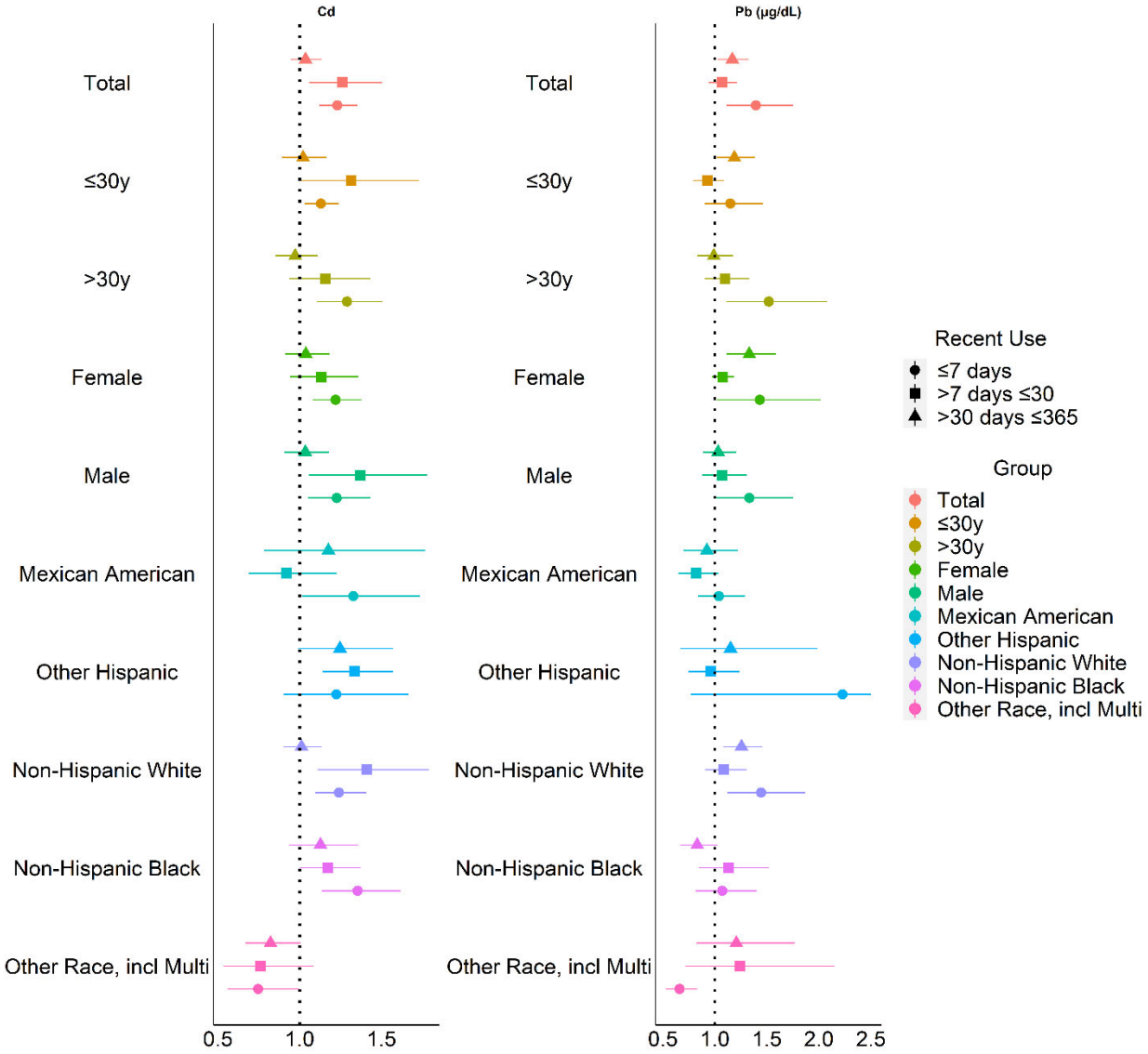
Numeric data can be found in Excel Table S11.
Metal abbreviations include nonessential metals: cadmium (Cd) and lead (Pb).
The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Current marijuana use is those who have used marijuana in the last 30 days (N=358). Current tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual users are both individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race, education, eGFR, and NHANES cycle year.

Figure S3. Mean differences and 95%CIs in urinary metal levels (µg/g) across different marijuana use groups analyzed by subgroup of age, sex, and race, N= 7,254 NHANES 2005-2018 participants.



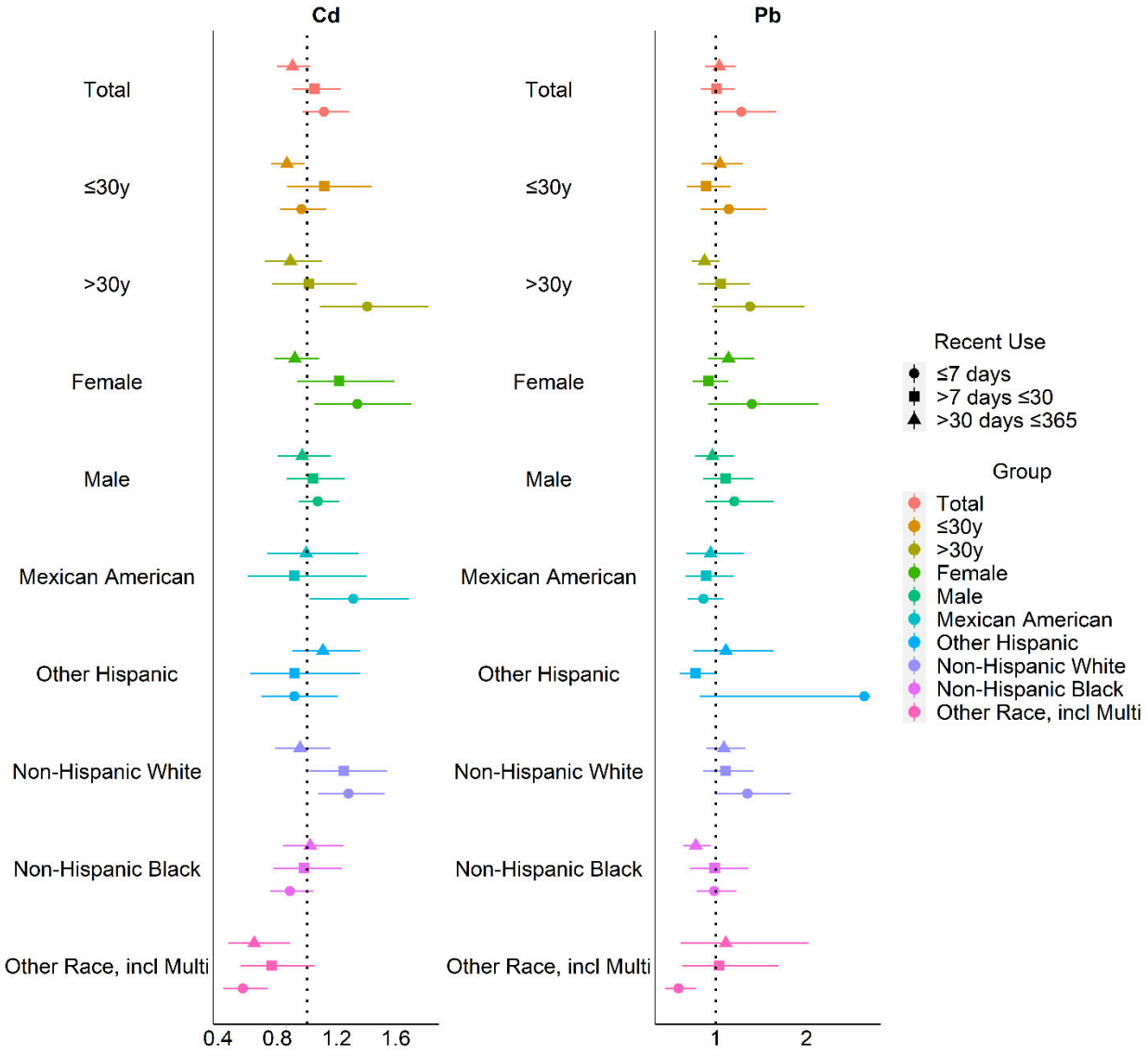
Numeric data can be found in Excel Table S12.
Metal abbreviations include nonessential metals: cadmium (Cd) and lead (Pb).
The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Current marijuana use is those who have used marijuana in the last 30 days (N=358). Current tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual users are both individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race, education, eGFR, and NHANES cycle year.

Figure S4. Mean differences and 95%CIs in blood metal concentrations (µg/L or µg/dL for Pb) in individuals who recently used marijuana analyzed by subgroup of age, sex, and race/ethnicity, N= 5,024 NHANES 2005-2018 participants.



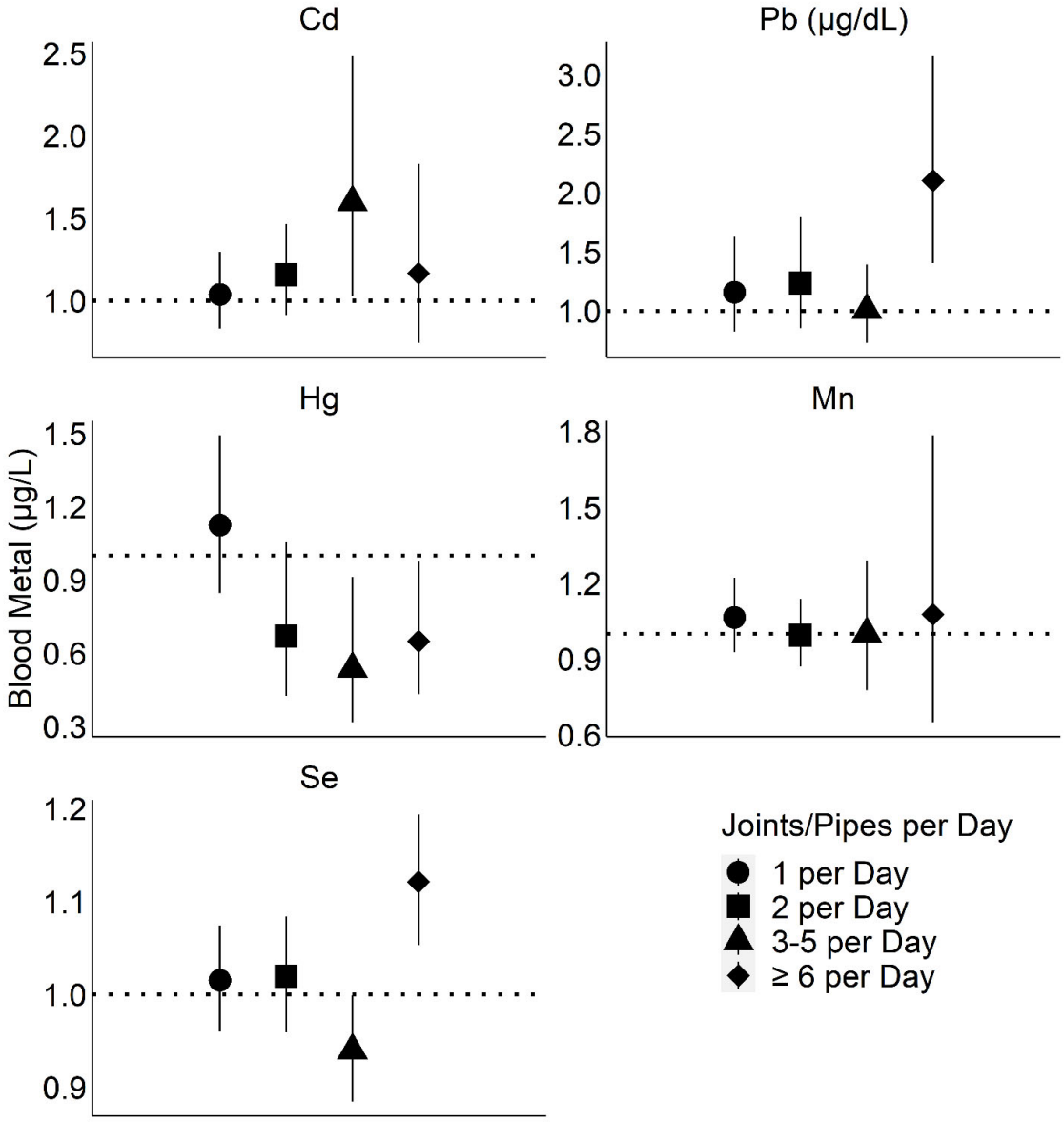
Numeric data can be found in Excel Table S13.
Metal abbreviations include nonessential metals: cadmium (Cd) and lead (Pb).
The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded.

Figure S5. Mean differences and 95%CIs in in urinary metal levels (µg/g) in individuals who recently used marijuana analyzed by subgroup of age, sex, and race/ethnicity, N= 5,024 NHANES 2005-2018 participants.



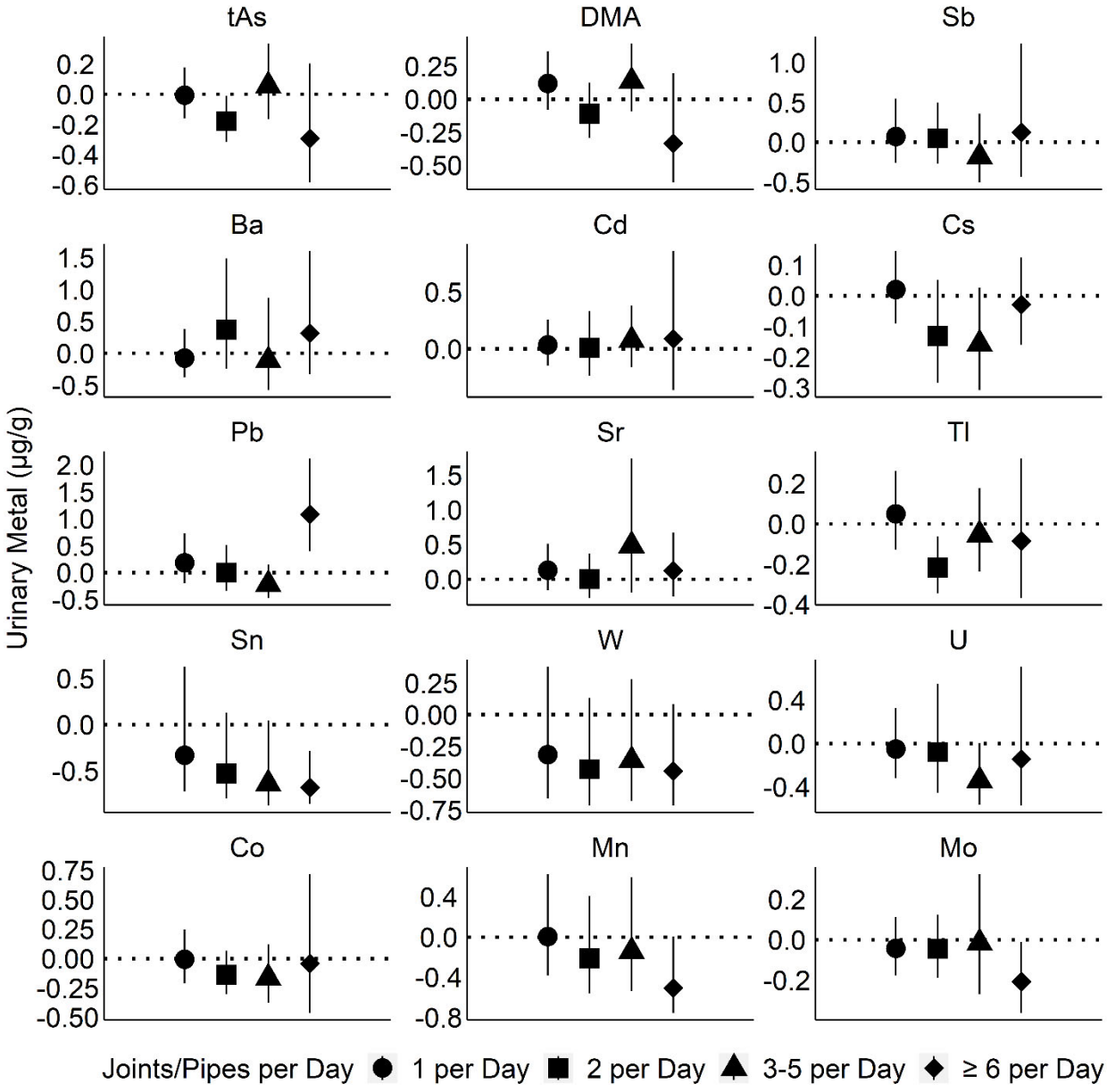
Numeric data can be found in Excel Table S14.
Metal abbreviations include nonessential metals: cadmium (Cd) and lead (Pb).
The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded.

Figure S6. Mean differences and 95%CIs in blood metal levels (µg/L or µg/dL for Pb) across different marijuana frequencies among exclusive marijuana users, N= 358 NHANES 2005-2018 participants.



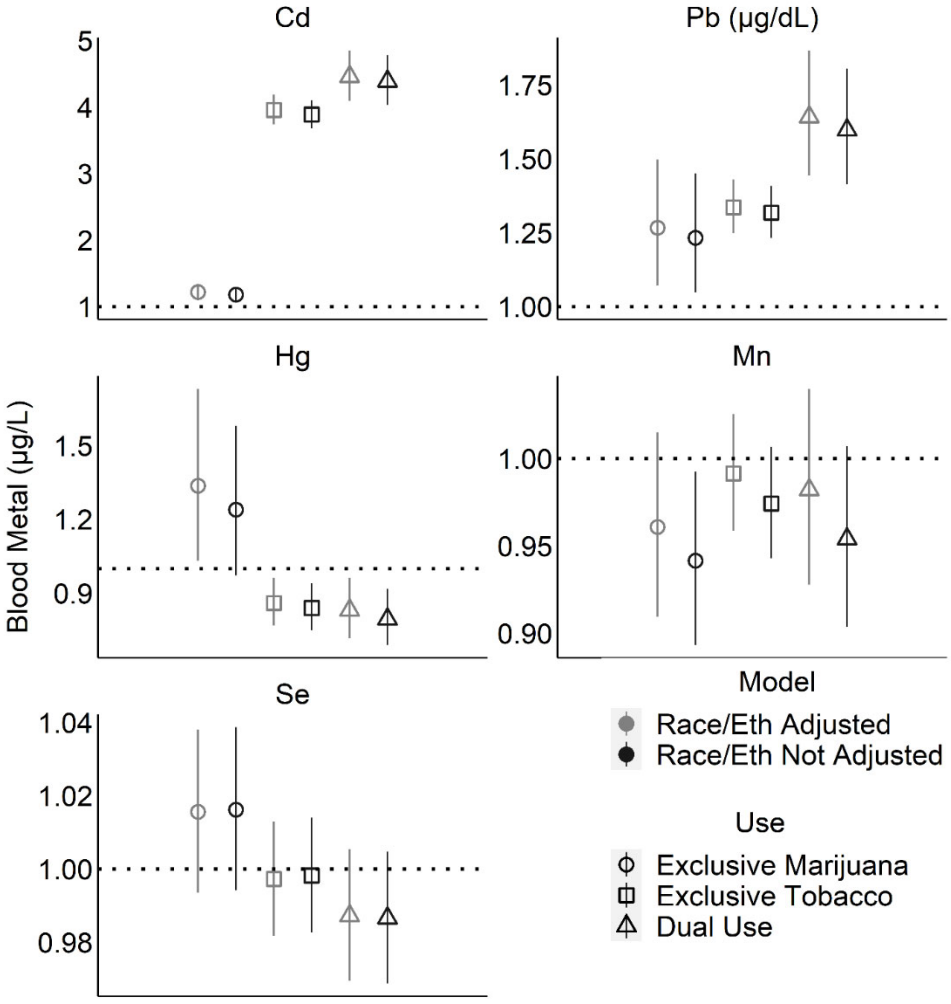
Numeric data can be found in Excel Table S15.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
Frequency was defined as 0 joints or pipes per day as the reference, 1 joint or pipe per day (circle), 2 joints or pipes per day (square), 3-5 joints or pipes per day (triangle), or ≥6 joints or pipes per day (diamond). Exclusive current marijuana use is those who have used marijuana in the last 30 days in the absence of use of tobacco products (N=358). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S7. Mean differences and 95%CIs in urinary metal levels (µg/g of creatinine) across different marijuana frequencies among exclusive marijuana users, N= 358 NHANES 2005-2018 participants.



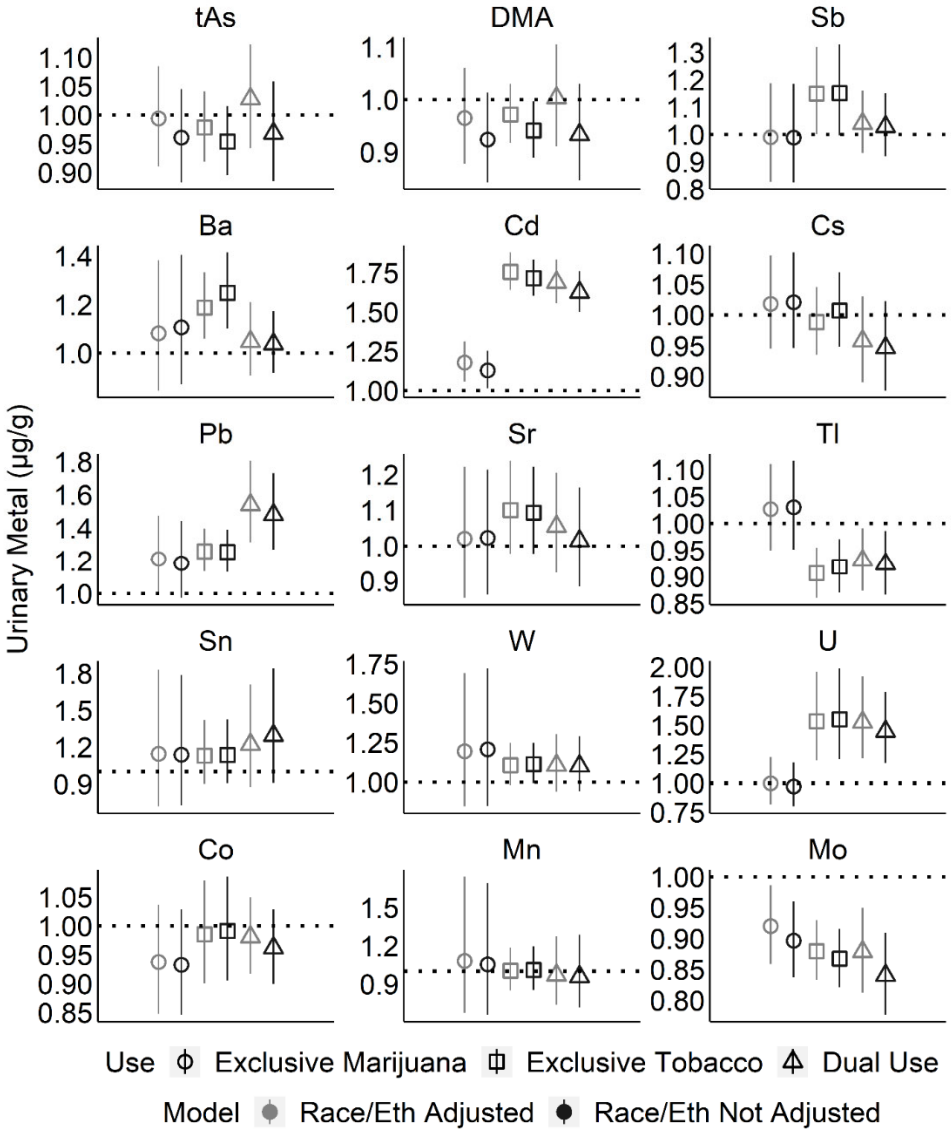
Numeric data can be found in Excel Table S16.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
Frequency was defined as 0 joints or pipes per day as the reference, 1 joint or pipe per day (circle), 2 joints or pipes per day (square), 3-5 joints or pipes per day (triangle), or ≥6 joints or pipes per day (diamond). Exclusive current marijuana use is those who have used marijuana in the last 30 days in the absence of use of tobacco products (N=358). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S8. Mean differences and 95%CIs in blood metal levels (μg/L or μg/dL for Pb) across different marijuana use groups with and without further adjustment for race and ethnicity in the model, N= 7,254 NHANES 2005-2018 participants.



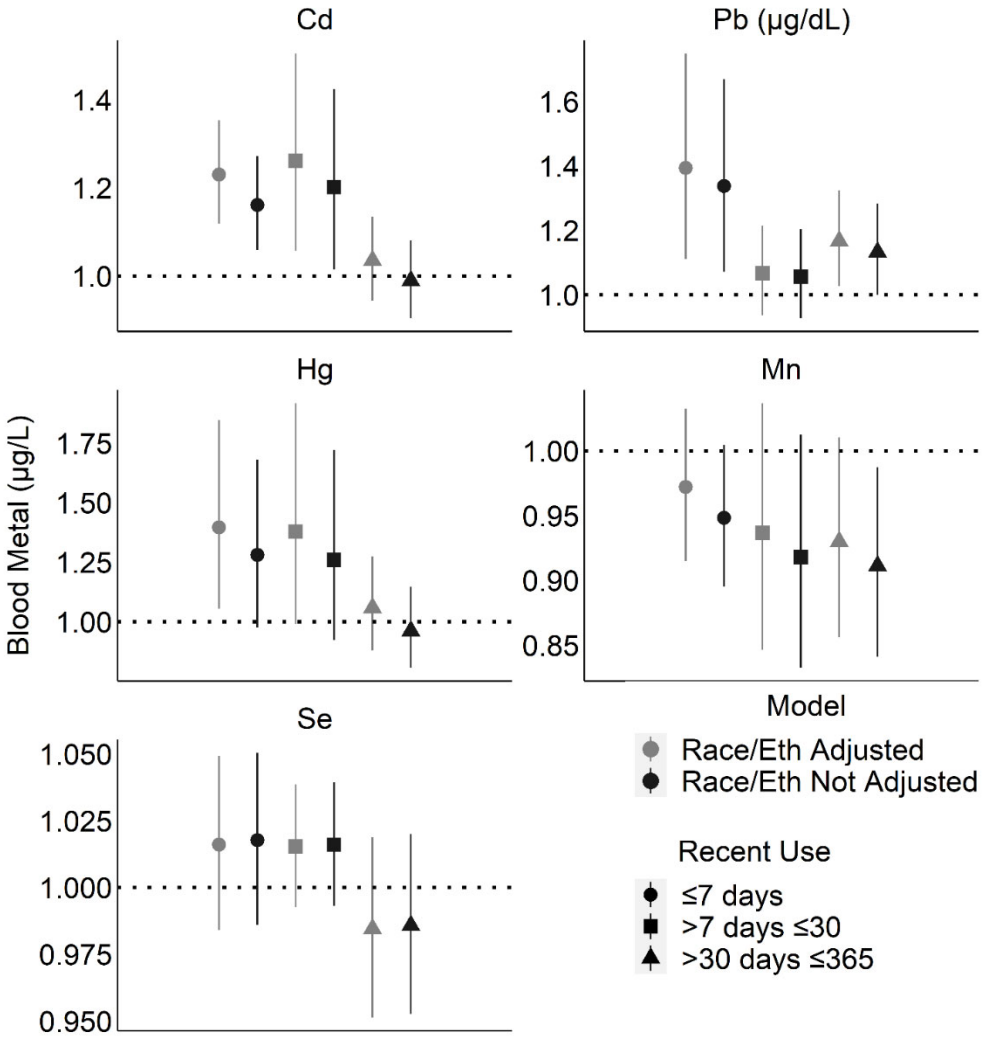
Numeric data can be found in Excel Table S17.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
Race/Eth Adjusted are the original models adjusting for race/ethnicity (light gray) and the Race/Eth Not Adjusted are the models not adjusting for race and ethnicity (dark gray). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana (in the last 30 days) and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S9. Mean differences and 95%CIs in urinary metal levels (µg/g creatinine) across different marijuana use groups with and without further adjustment for race and ethnicity in the model, N= 7,254 NHANES 2005-2018 participants.



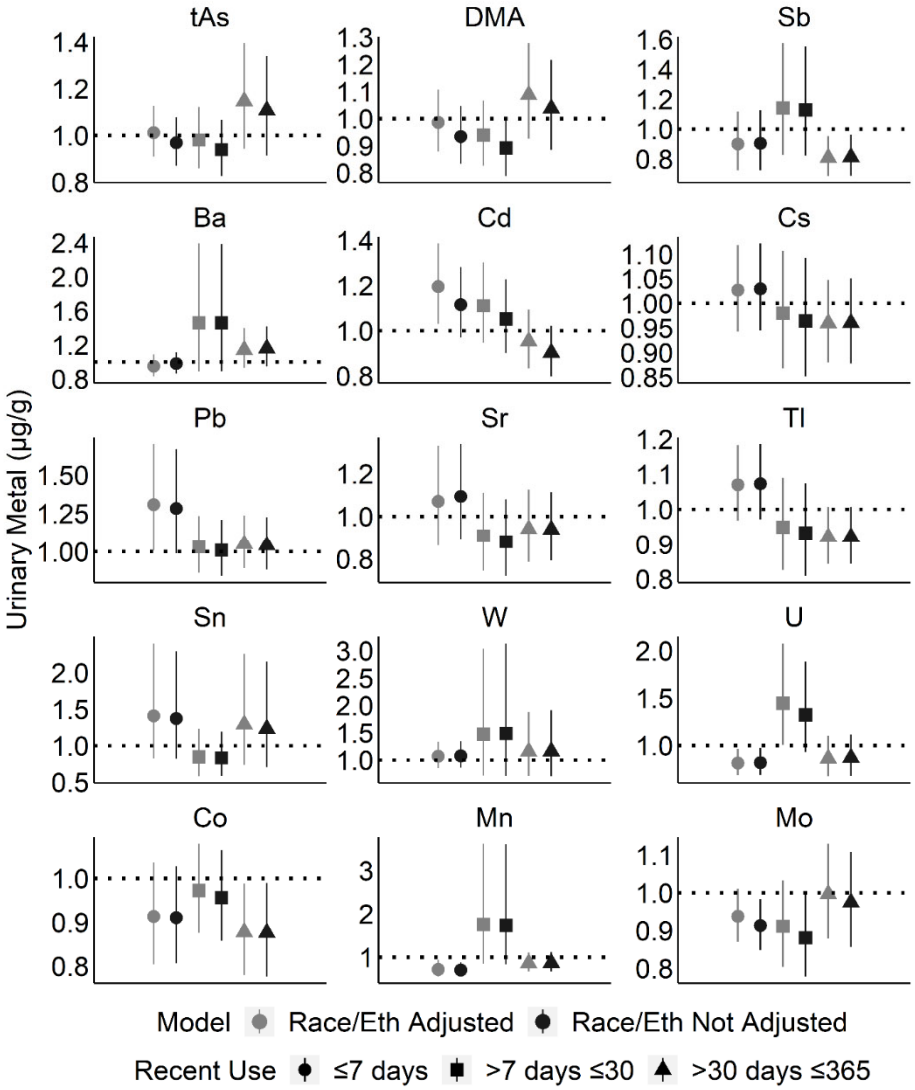
Numeric data can be found in Excel Table S18.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
Race/Eth Adjusted are the original models adjusting for race/ethnicity (light gray) and the Race/Eth Not Adjusted are the models not adjusting for race and ethnicity (dark gray). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana (in the last 30 days) and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race, education, eGFR, and NHANES cycle year.

Figure S10. Mean differences and 95%CIs in blood metal levels (µg/L or µg/dL for Pb) in individuals who recently used marijuana with and without further regression adjustment for race and ethnicity, N= 5,024 NHANES 2005-2018 participants.



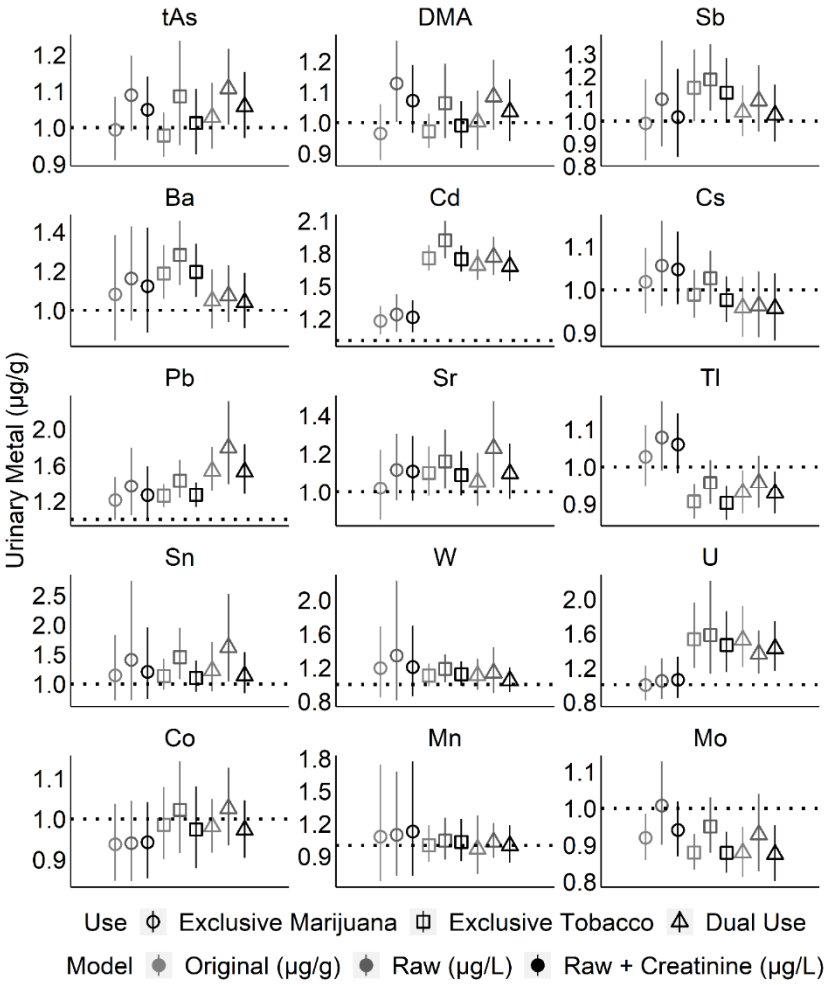
Numeric data can be found in Excel Table S19.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
Race/Eth Adjusted are the original models adjusting for race and ethnicity (dark gray) and the Race/Eth Not Adjusted are the models not adjusting for race and ethnicity (light gray). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age .Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S11. Mean differences and 95%CIs in urinary metal levels (µg/g creatinine) in individuals who recently used marijuana with and without further regression adjustment for race and ethnicity, N= 5,024 NHANES 2005-2018 participants.



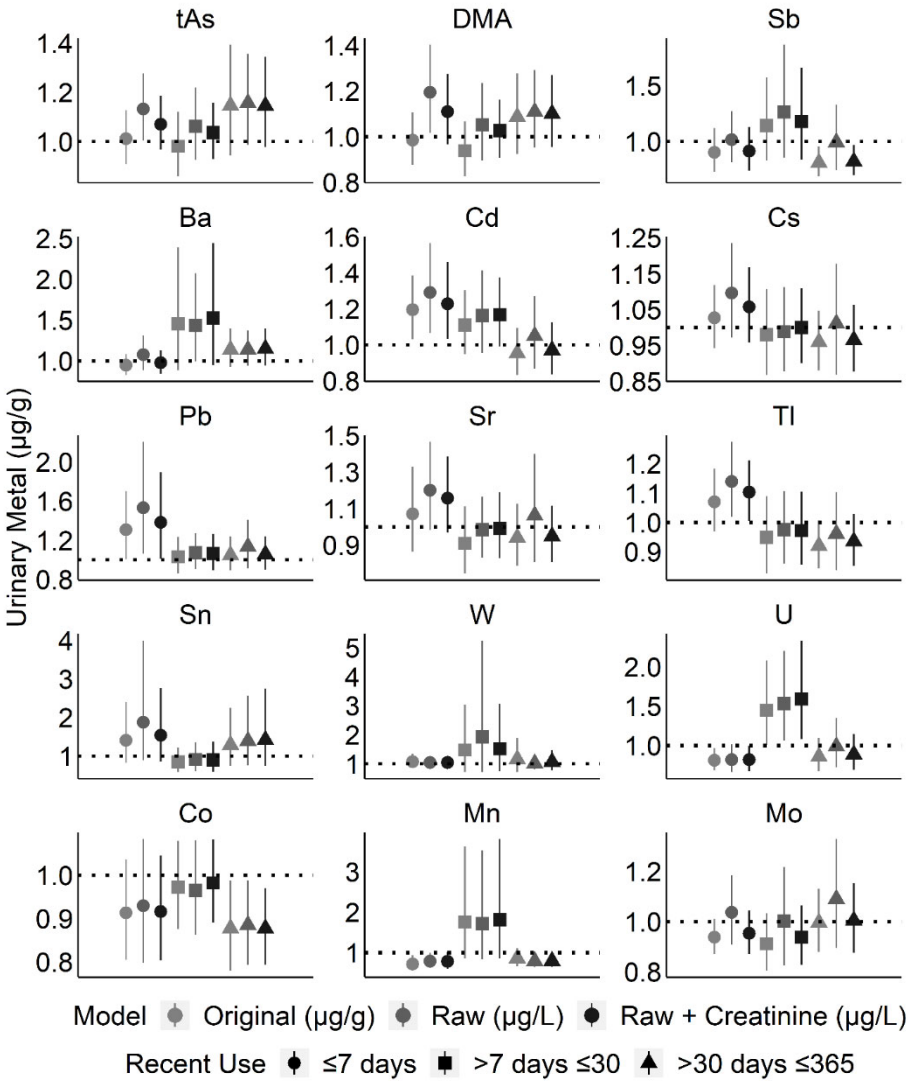
Numeric data can be found in Excel Table S20.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
Race/Eth Adjusted are the original models adjusting for race and ethnicity (dark gray) and the Race/Eth Not Adjusted are the models not adjusting for race and ethnicity (light gray). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age .Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S12. Mean differences and 95%CIs in urinary metal levels (µg/g creatinine) across different marijuana use groups with and without further adjustment for urinary creatinine in the model, N= 7,254 NHANES 2005-2018 participants.



Numeric data can be found in Excel Table S21.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
The original models (light gray) are those using urinary metal values divided by urinary creatinine in (µg/g), raw models (medium gray) are those using urinary metals not divided by urinary creatinine (µg/L), and raw + creatinine models (dark gray) are those using urinary metals not divided by urinary creatinine but include urinary creatinine as an adjustment in the model (µg/L). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S13. Mean differences and 95%CIs in urinary metal levels (µg/g creatinine) in individuals who recently used marijuana with and without further adjustment for urinary creatinine in the model, N= 5,024 NHANES 2005-2018 participants.

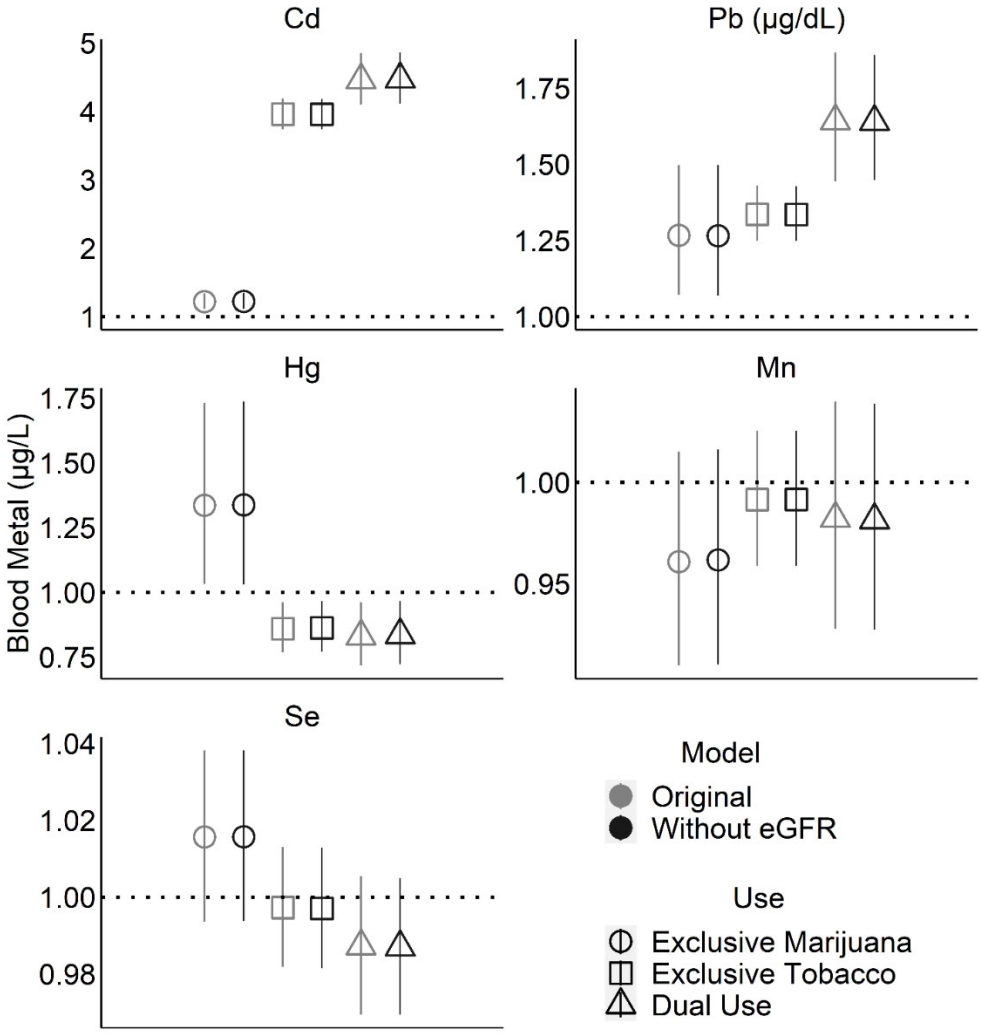


Numeric data can be found in Excel Table S22.

Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).

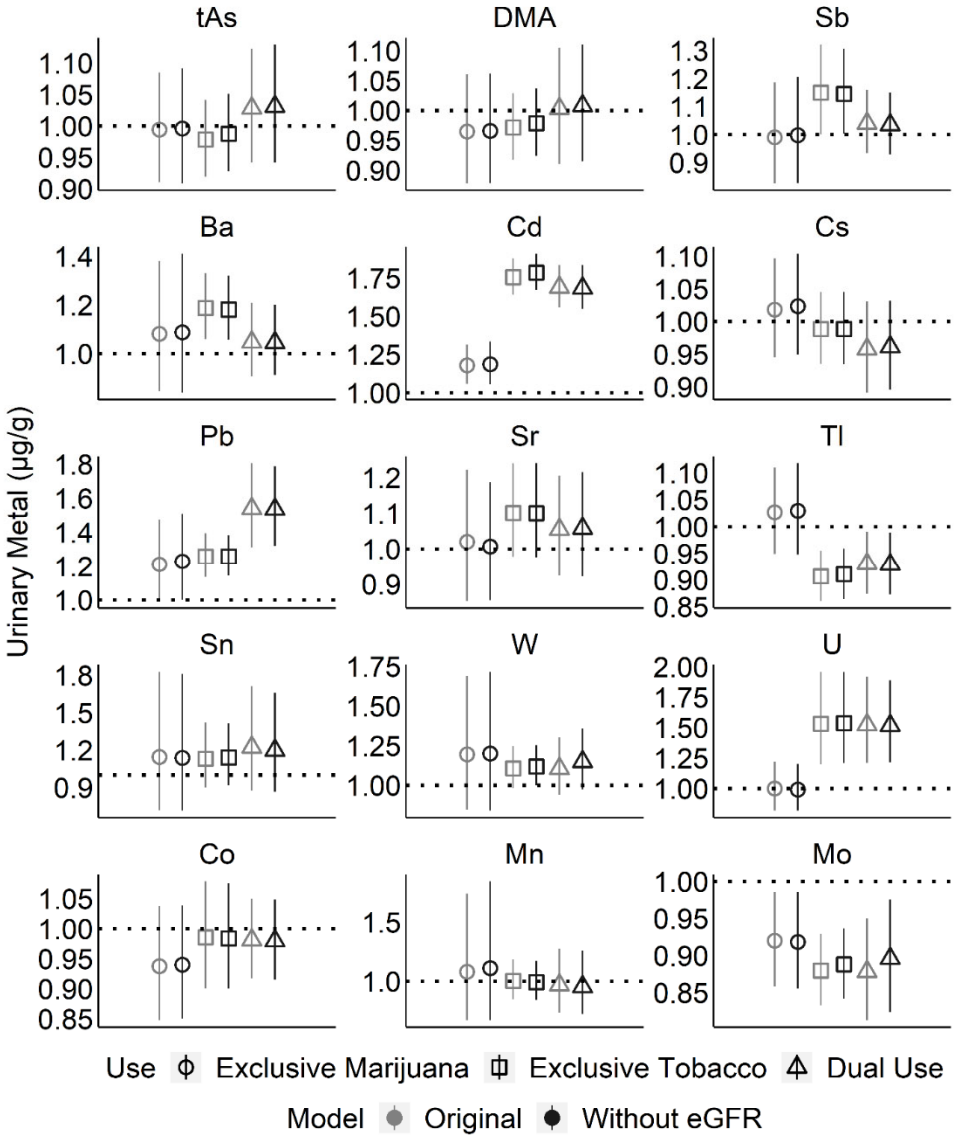
The original models (light gray) are those using urinary metal values divided by urinary creatinine in (µg/g), raw models (medium gray) are those using urinary metals not divided by urinary creatinine (µg/L), and raw + creatinine models (dark gray) are those using urinary metals not divided by urinary creatinine but include urinary creatinine as an adjustment in the model (µg/L). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age .Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S14. Mean differences and 95%CIs in blood metal levels (µg/L or µg/dL for Pb) across different marijuana use with and without further regression adjustment for eGFR, N= 7,254 NHANES 2005-2018 participants.



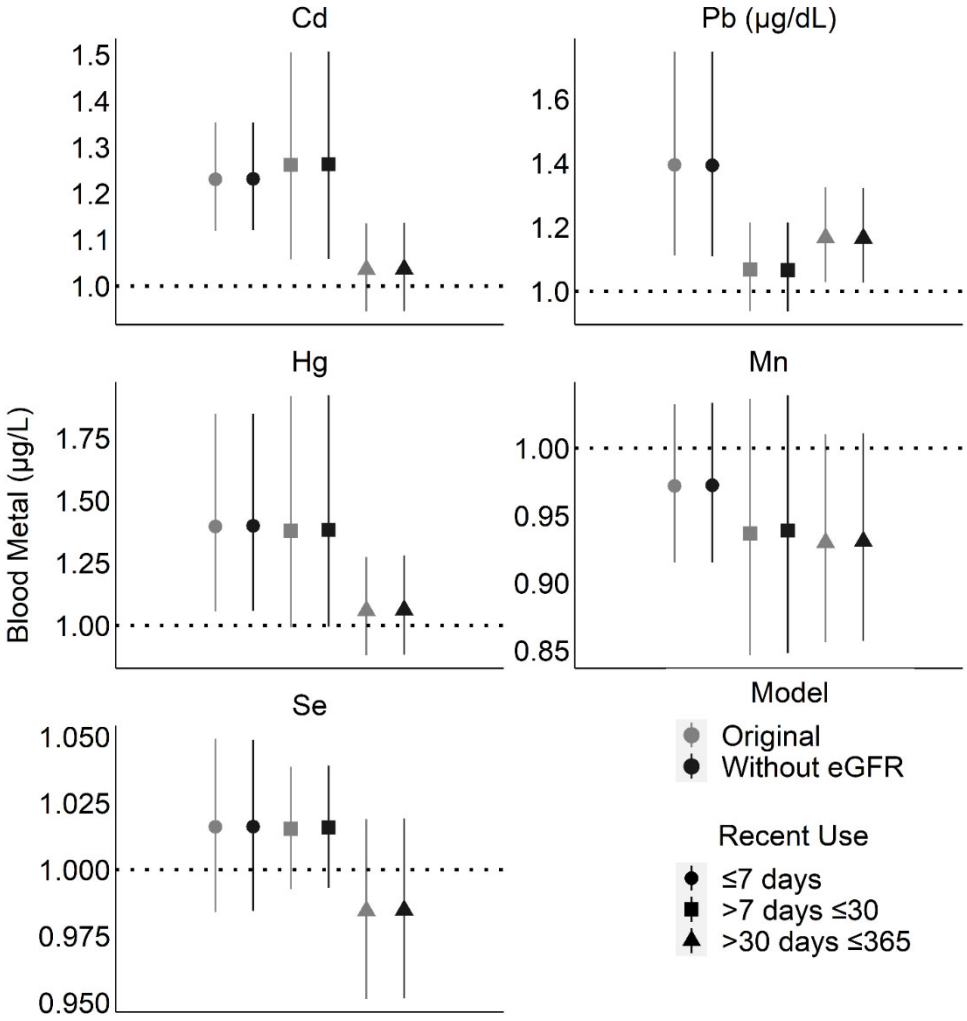
Numeric data can be found in Excel Table S23.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
The original models are those adjusting for eGFR (light gray) and those not adjusting for eGFR dark gray). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S15. Mean differences and 95%CIs in urinary metal levels (μg/g creatinine) across different marijuana use with and without further regression adjustment for eGFR, N= 7,254 NHANES 2005-2018 participants.



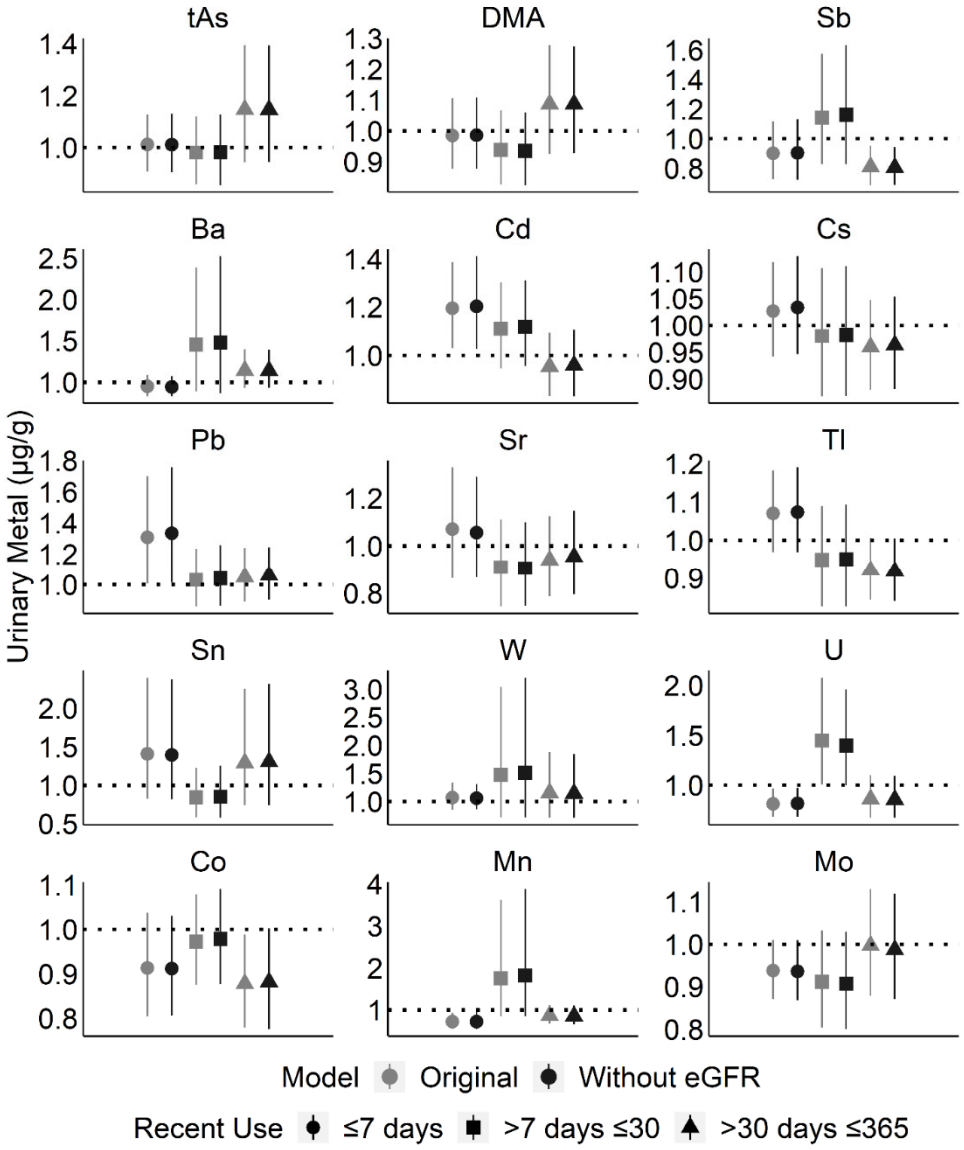
Numeric data can be found in Excel Table S24.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
The original models are the original models adjusting for eGFR (light gray) and those not adjusting for eGFR (dark gray). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S16. Mean differences and 95%CIs in blood metal levels (µg/L or µg/dL for Pb) in individuals who recently used marijuana with and without further regression adjustment for eGFR, N= 5,024 NHANES 2005-2018 participants.



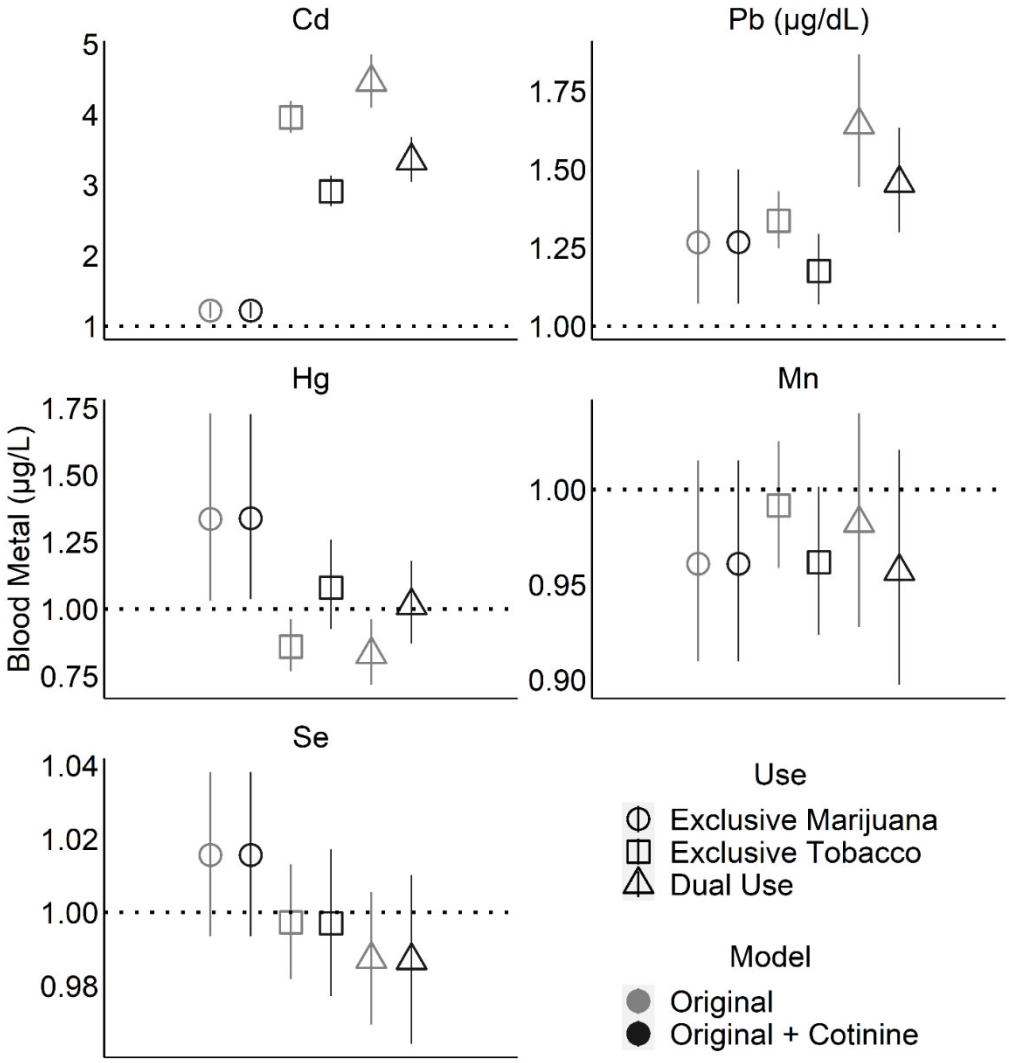
Numeric data can be found in Excel Table S25.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
The original models are those adjusting for eGFR (light gray) and those not adjusting for eGFR (dark gray). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age. Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S17. Mean differences and 95%CIs in urinary metal levels (µg/g creatinine) in individuals who recently used marijuana with and without further regression adjustment for eGFR, N= 5,024 NHANES 2005-2018 participants.



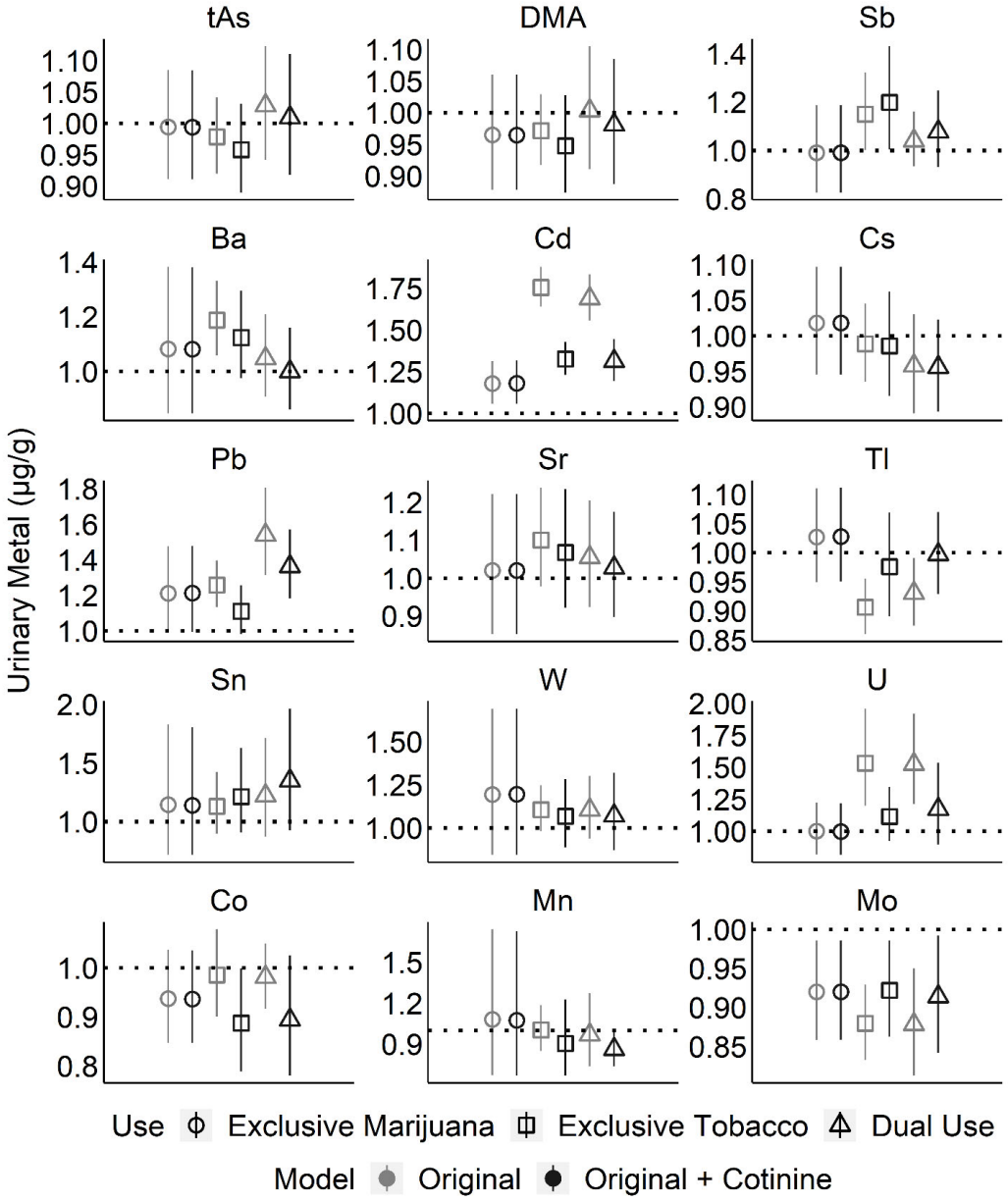
Numeric data can be found in Excel Table S26.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
The original models are those adjusting for eGFR (light gray) and those not adjusting for eGFR (dark gray). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age. Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S18. Mean differences and 95%CIs in blood metal levels across different marijuana use with and without further regression adjustment for serum cotinine, N= 7,254 NHANES 2005-2018 participants.



Numeric data can be found in Excel Table S27.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
The original models are those not adjusting for serum cotinine (light gray) and the original + cotinine are those further adjusting for serum cotinine (dark gray). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S19. Mean differences and 95%CIs in urinary metal levels (µg/g creatinine) across different marijuana use with and without further regression adjustment for serum cotinine, N= 7,254 NHANES 2005-2018 participants.

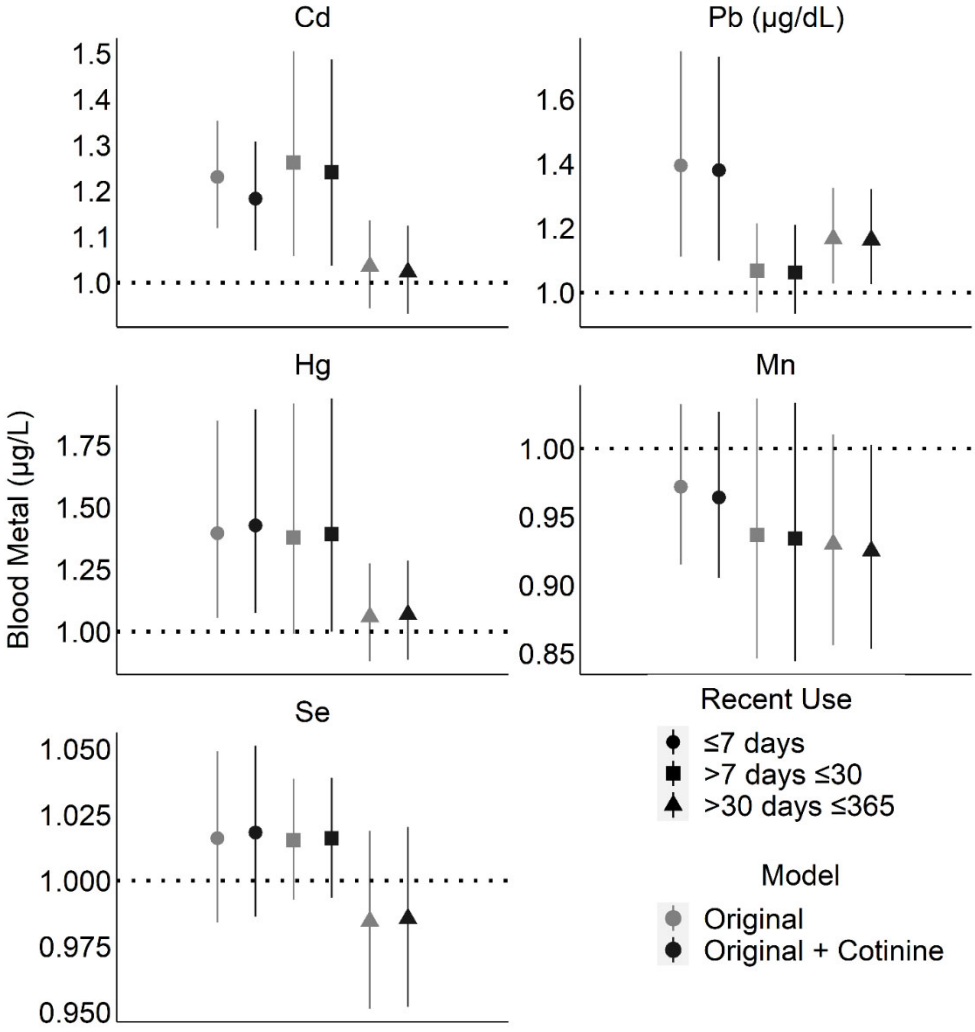


Numeric data can be found in Excel Table S28.

Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).

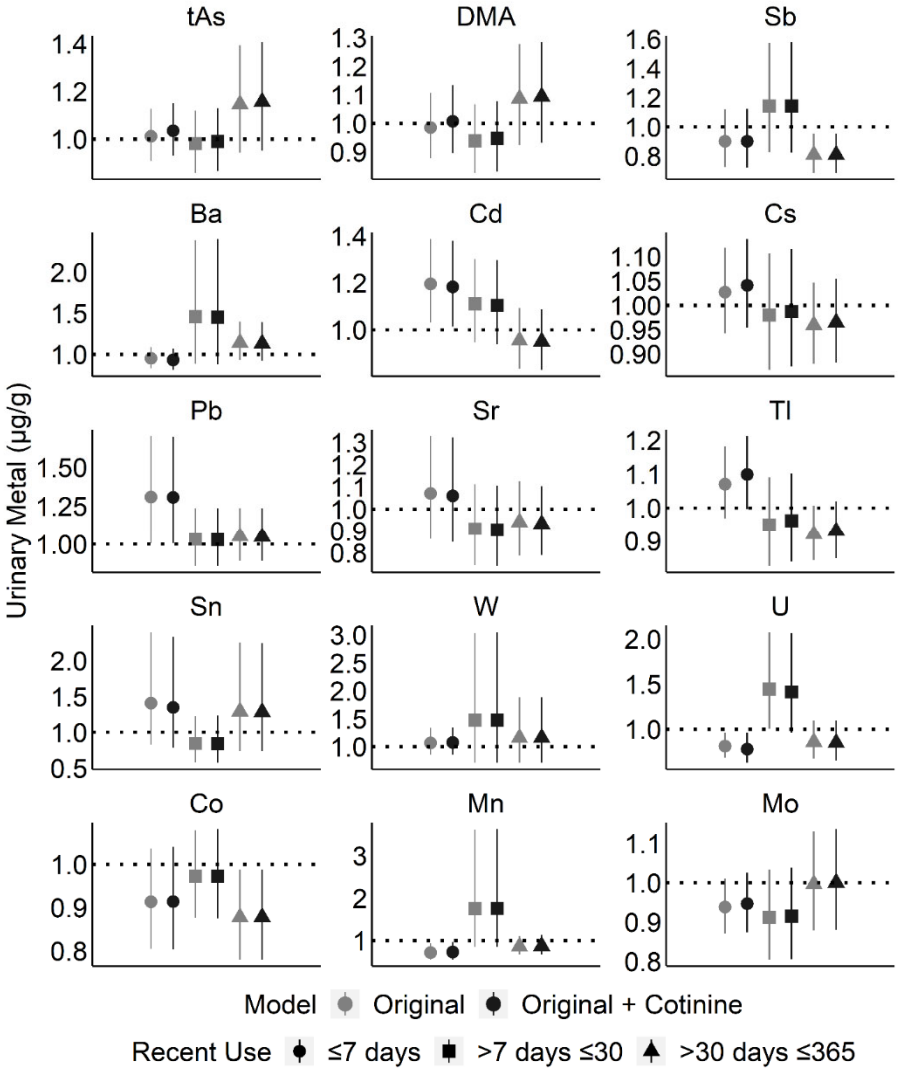
The original models are those not adjusting for serum cotinine (light gray) and the original + cotinine are those further adjusting for serum cotinine (dark gray). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S20. Mean differences and 95%CIs in blood metal levels in individuals who recently used marijuana with and without further regression adjustment for serum cotinine, N= 5,024 NHANES 2005-2018 participants.



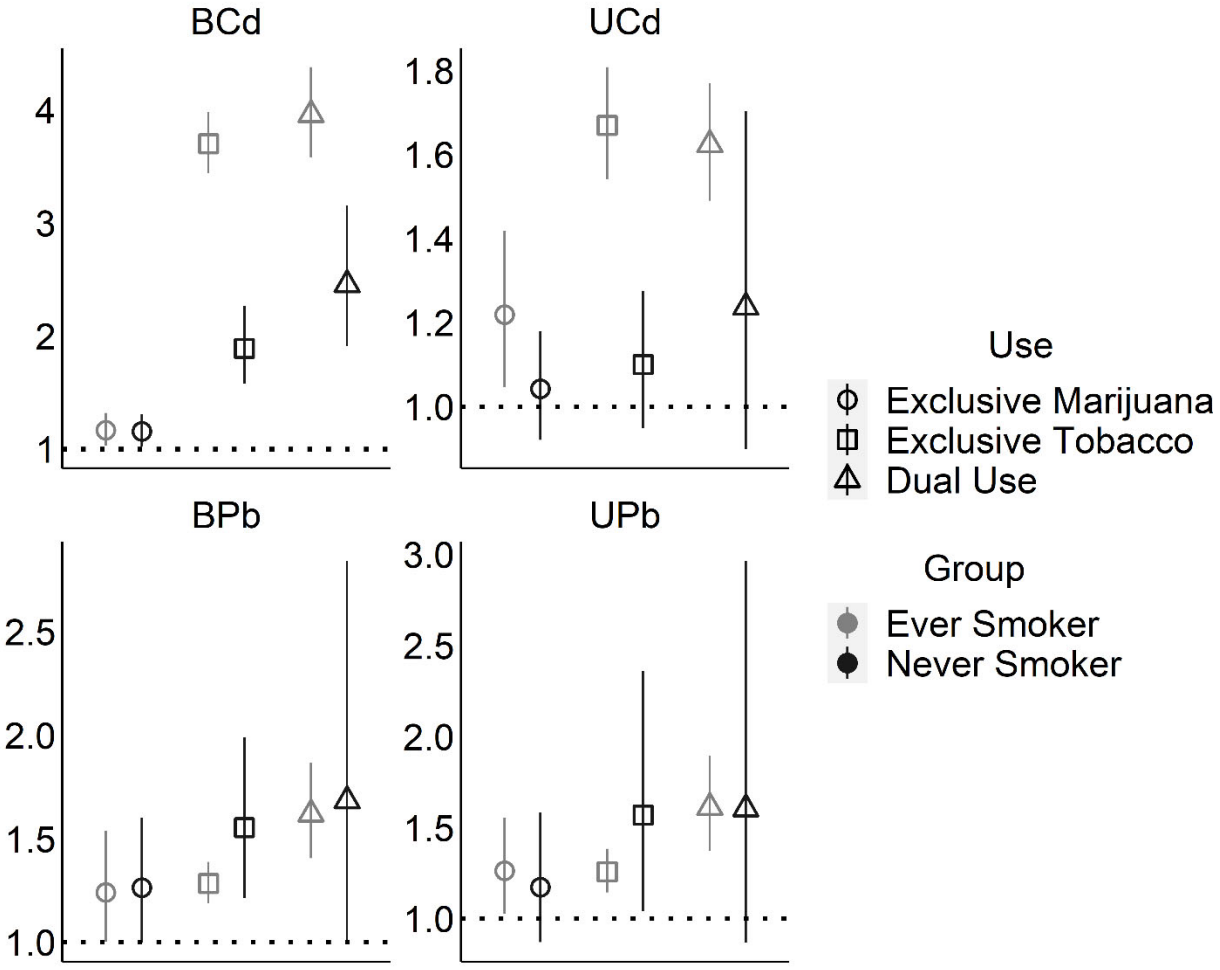
Numeric data can be found in Excel Table S29.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
The original models are those not adjusting for serum cotinine (light gray) and the original + cotinine are those further adjusting for serum cotinine (dark gray). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age. Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S21. Mean differences and 95%CIs in urinary metal levels (µg/g creatinine) in individuals who recently used marijuana with and without further regression adjustment for serum cotinine, N= 5,024 NHANES 2005-2018 participants.



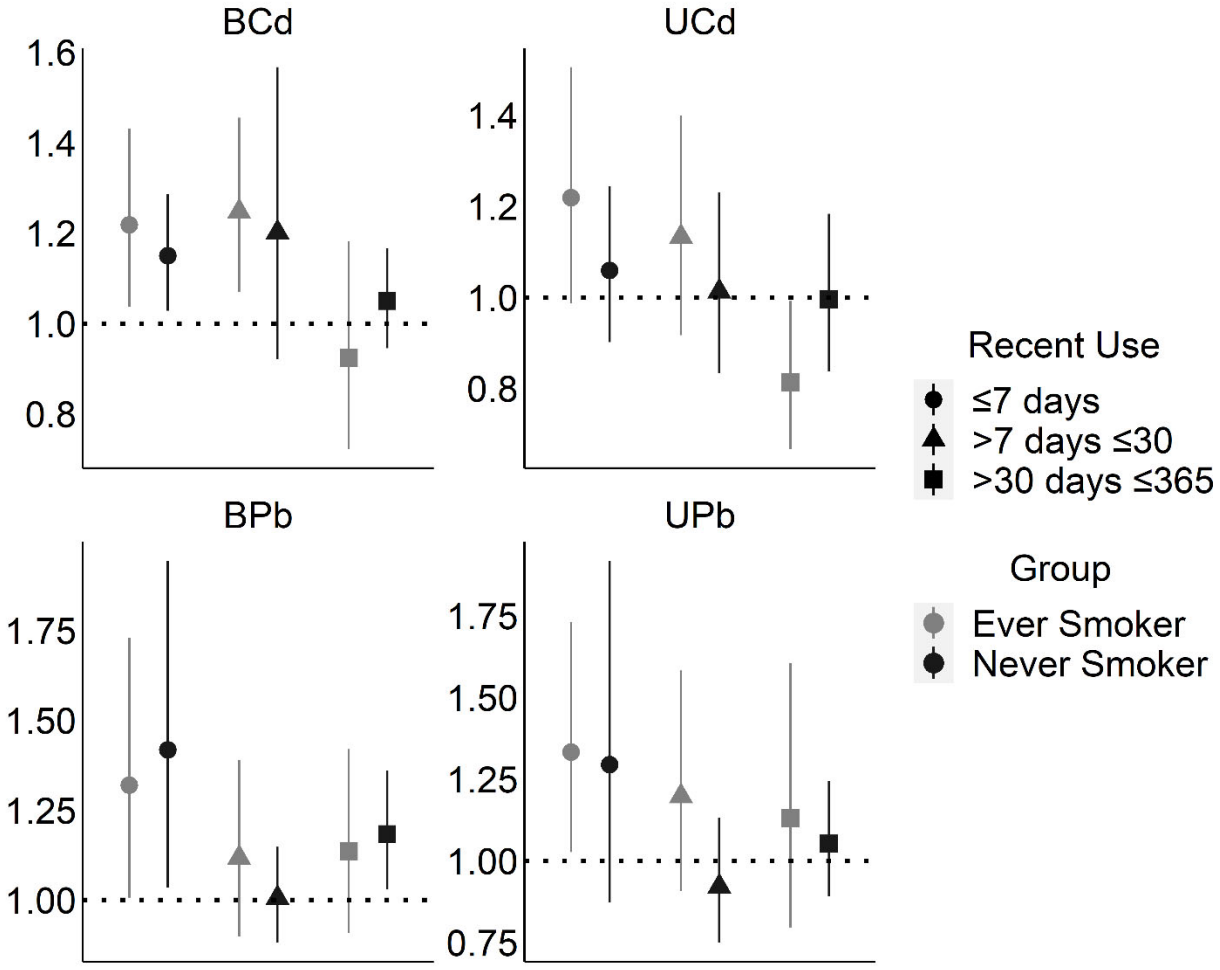
Numeric data can be found in Excel Table S30.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
The original models are those not adjusting for serum cotinine (light gray) and the original + cotinine are those further adjusting for serum cotinine (dark gray). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age. Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S22. Mean differences and 95%CIs in urinary and blood metal levels (UCd: urinary cadmium levels (µg/g), BCd: blood cadmium levels (µg/L), UPb: urinary lead levels (µg/g), and BPb: blood lead levels (µg/dL)) across different marijuana use groups, stratified by former smoking status, never smoking and ever smoking, in N= 7,246 NHANES 2005-2018 participants.



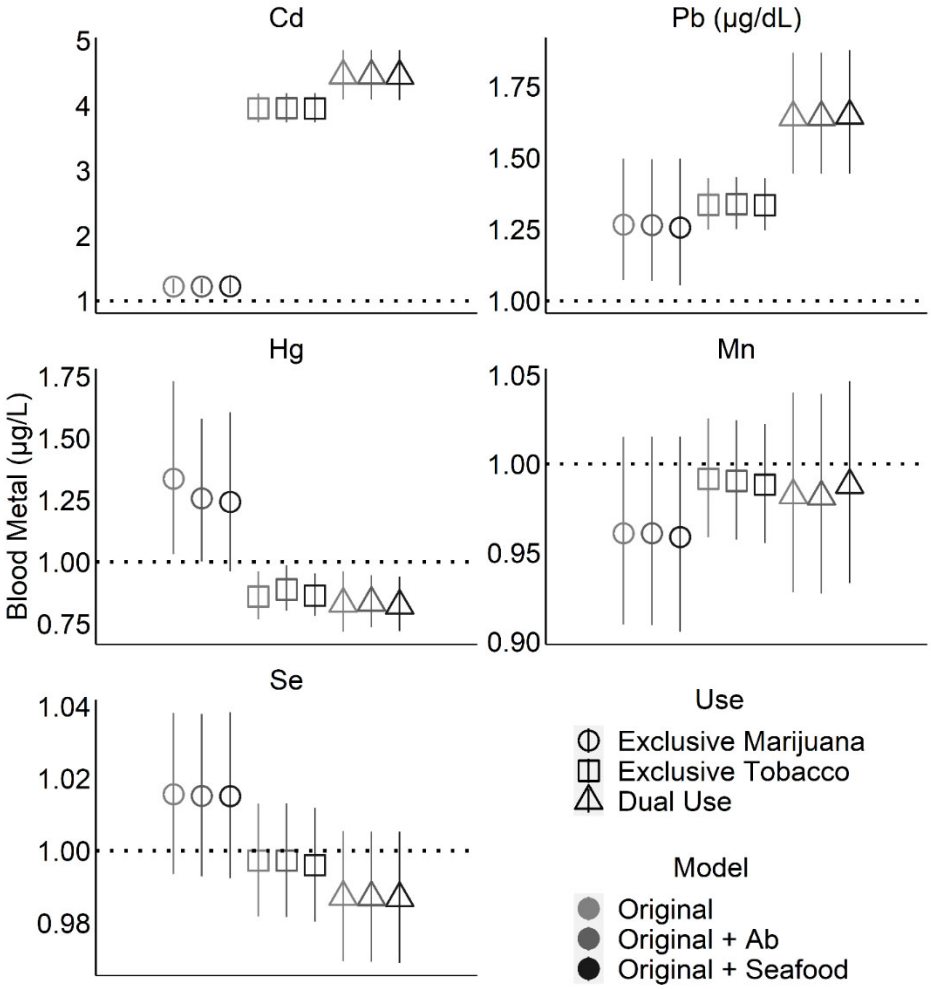
Numeric data can be found in Excel Table S31.
Metal abbreviations include nonessential metals: blood cadmium (BCd), urine cadmium (UCd), blood lead (Pb), and urine lead (UPb).
Ever smokers are defined as those who responded they have smoked at least 100 cigarettes in their lifetime (light gray). Never smokers are defined as those who have not smoked at least 100 cigarettes in their lifetime (dark gray). The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S23. Mean differences and 95%CIs in urinary and blood metal levels (UCd: urinary cadmium levels (µg/g), BCd: blood cadmium levels (µg/L), UPb: urinary lead levels (µg/g), and BPb: blood lead levels (µg/dL)) in individuals who recently used marijuana, stratified by former smoking status, never smoking and ever smoking, in N= 5,024 NHANES 2005-2018 participants.



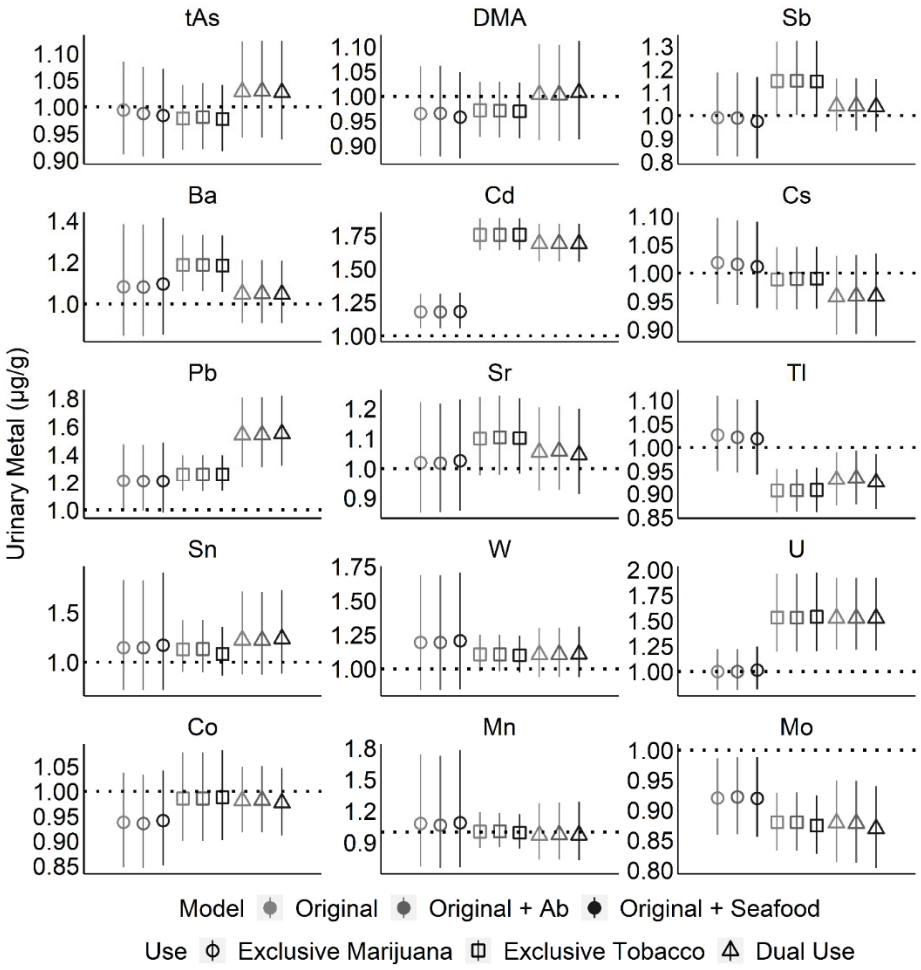
Numeric data can be found in Excel Table S32.
Metal abbreviations include nonessential metals: blood cadmium (BCd), urine cadmium (UCd), blood lead (Pb), and urine lead (UPb).
Ever smokers are defined as those who responded they have smoked at least 100 cigarettes in their lifetime (light gray). Never smokers are defined as those who have not smoked at least 100 cigarettes in their lifetime (dark gray). The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age. Models were adjusted for age, sex, race and ethnicity, education, eGFR, and NHANES cycle year.

Figure S24. Mean differences and 95%CIs in blood metal levels across different marijuana use with and without further adjustment for different measures of seafood consumption.



Numeric data can be found in Excel Table S33.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
Models include original models (light gray), original models adjusted for urinary levels of arsenobetaine, an indicator of seafood consumption (medium gray), and original models adjusted for dietary recall of seafood consumption within the last 30 days (dark gray), N= 7,254 NHANES 2005-2018 participants. The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, NHANES cycle year, or including measure of seafood consumption.

Figure S25. Mean differences and 95%CIs in urinary metal levels across different marijuana use with and without further adjustment for different measures of seafood consumption.

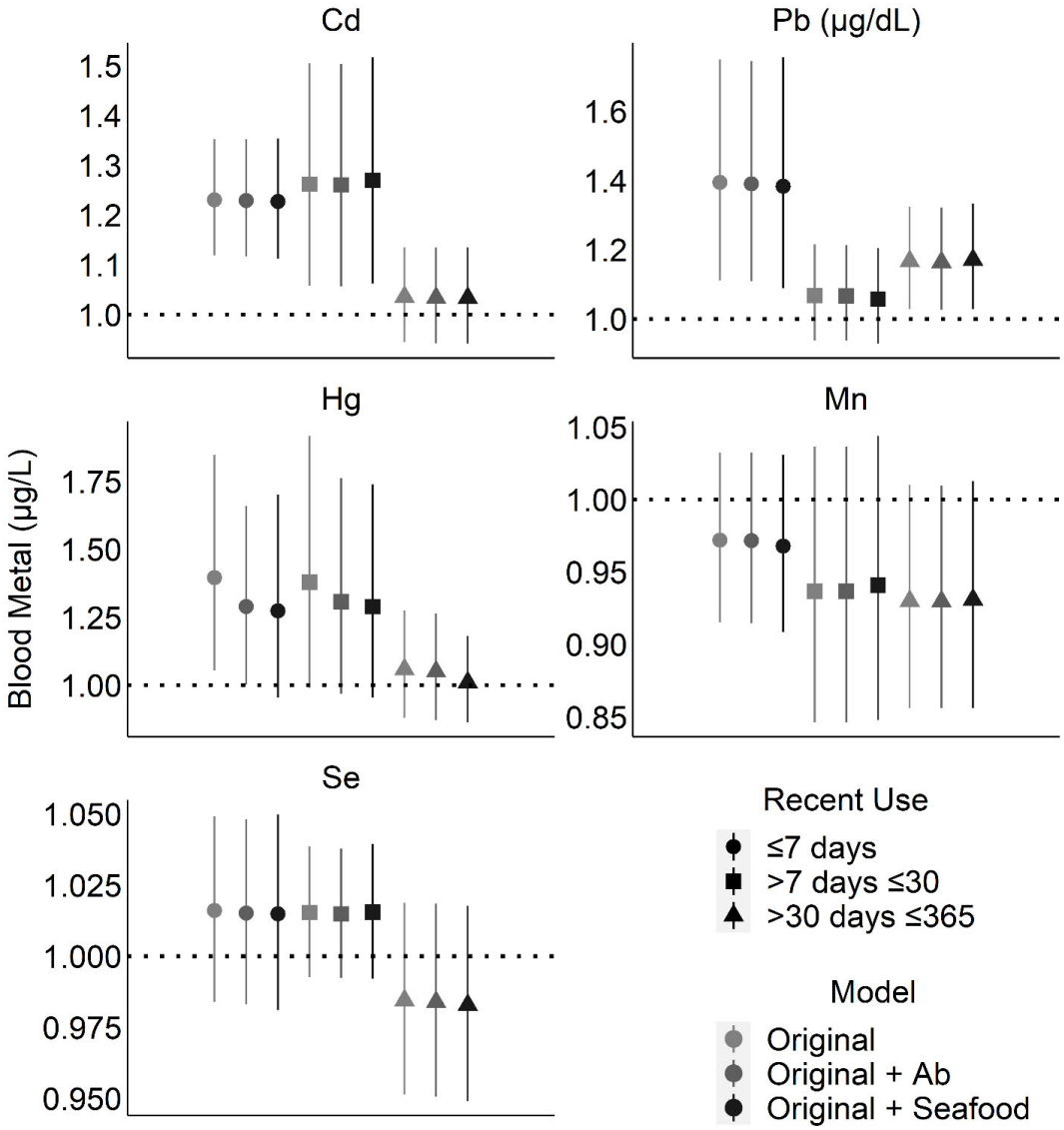


Numeric data can be found in Excel Table S34.

Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).

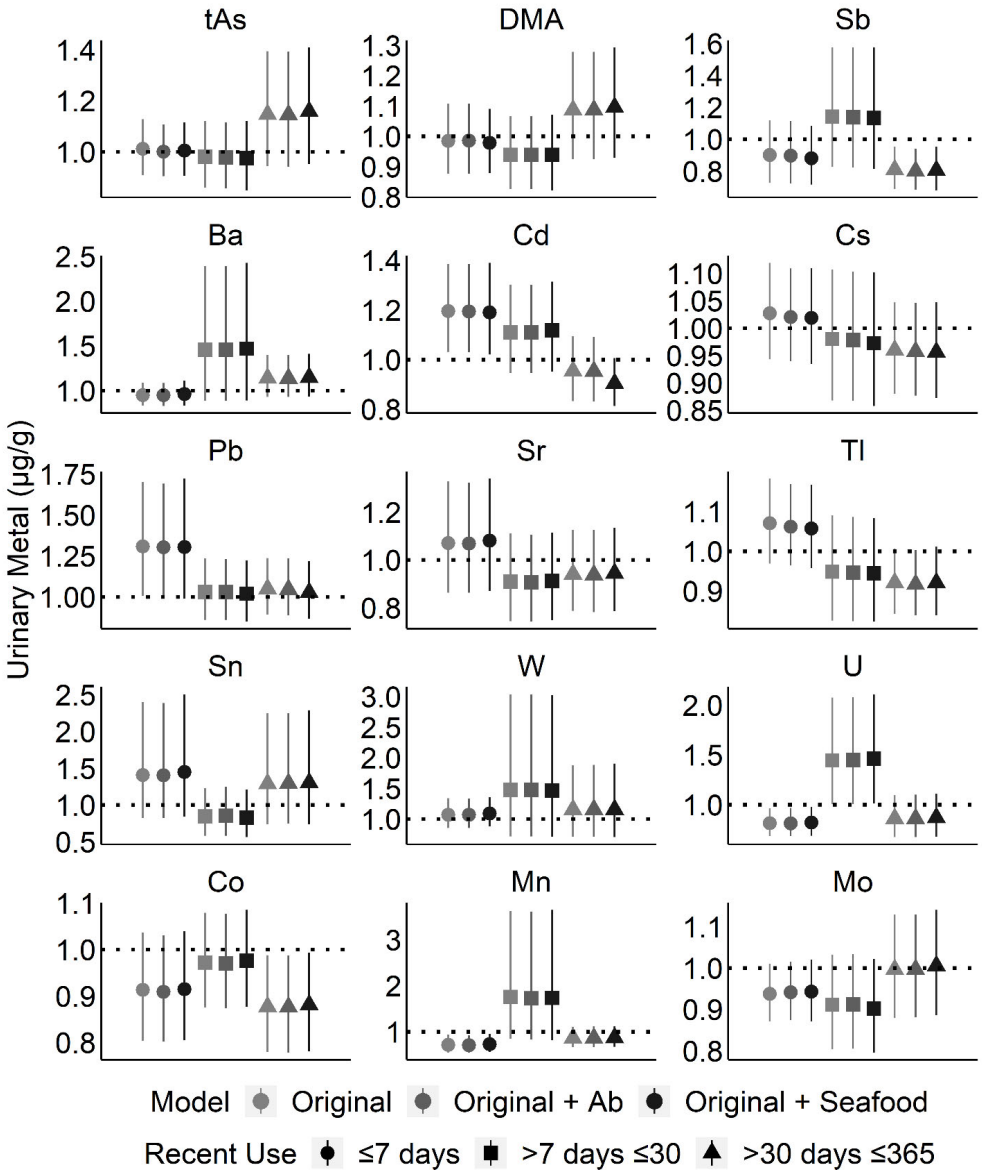
Models include original models (light gray), original models adjusted for urinary levels of arsenobetaine, an indicator of seafood consumption (medium gray), and original models adjusted for dietary recall of seafood consumption within the last 30 days (dark gray), N= 7,254 NHANES 2005-2018 participants. The reference group of non-marijuana/non-tobacco use includes individuals who have not used marijuana in the last 30 days and individuals who self-report they do not currently smoke cigarettes or those with serum cotinine levels ≤10ng/mL (N=4,666). Exclusive marijuana use is those who have used marijuana in the last 30 days (N=358). Exclusive tobacco use is those who self-reported currently smoking cigarettes or those with serum cotinine levels >10ng/mL and have not used marijuana in the last 30 days (N=1,511) and dual use is individuals who currently use marijuana and currently smoke cigarettes or have serum cotinine levels >10ng/mL (N=719). Models were adjusted for age, sex, race and ethnicity, education, eGFR, NHANES cycle year, or including measure of seafood consumption.

Figure S26. Mean differences and 95%CIs in blood metal levels in individuals who recently used with and without further adjustment for different measures of seafood consumption.



Numeric data can be found in Excel Table S35.
Metal abbreviations include nonessential metals: cadmium (Cd), lead (Pb), mercury (Hg), and essential metals: manganese (Mn), and selenium (Se).
Models include original models (light gray), original models adjusted for urinary levels of arsenobetaine, an indicator of seafood consumption (medium gray), and original models adjusted for dietary recall of seafood consumption within the last 30 days (dark gray), N= 5,024 NHANES 2005-2018 participants. The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age. Models were adjusted for age, sex, race and ethnicity, education, eGFR, NHANES cycle year, or including measure of seafood consumption.

Figure S27. Mean differences and 95%CIs in urinary metal levels in individuals who recently used with and without further adjustment for different measures of seafood consumption.



Numeric data can be found in Excel Table S36.
Metal abbreviations include nonessential metals: total arsenic (tAs), dimethylarsinic acid (DMA), antimony (Sb), barium (Ba), cadmium (Cd), cesium (Cs), lead (Pb), strontium (Sr), thallium (tl), tin, (Sn), tungsten (W), uranium (U), and essential metals cobalt (Co), manganese (Mn), and molybdenum (Mo).
Models include original models (light gray), original models adjusted for urinary levels of arsenobetaine, an indicator of seafood consumption (medium gray), and original models adjusted for dietary recall of seafood consumption within the last 30 days (dark gray), N= 5,024 NHANES 2005-2018 participants. The reference group of non-use includes individuals who neither use marijuana or tobacco nor have not used marijuana in more than one year (N=4,455). Groups of individuals who had recently used marijuana include those who had used in the last 7 days (N=226), those who had used in the last 7-30 days (N=132), or those who had used in the 31-365 days (N=211). Individuals who self-reported cigarette smoking or had serum cotinine levels >10ng/mL were excluded. Values of Hg only include women of childbearing age. Models were adjusted for age, sex, race and ethnicity, education, eGFR, NHANES cycle year, or including measure of seafood consumption.