

Supplemental Table S1. Spearman correlation coefficients for suite of 17 trace and toxic metals measured in 75 toenail samples

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Supplemental Table S2. Associations between toenail metals concentrations and pulmonary function parameters among children with asthma (Hispanic only; n=35)

Exposure (µg/g)	ln (FEV1, L) ^a	ln (FVC, L) ^a	ln (FEV1:FVC) ^a	ln (FEF 25-75, L/sec) ^a
	β (SE)	β (SE)	β (SE)	β (SE)
Adjacent Community	-0.003 (0.07)	0.0005 (0.06)	-0.01 (0.05)	-0.05 (0.16)
P value	0.96	0.99	0.89	0.73
Aluminum ≥ 13.4	-0.04 (0.05)	0.01 (0.04)	-0.05 (0.03)	-0.13 (0.11)
P value	0.45	0.74	0.13	0.23
Arsenic ≥ 0.15	-0.004 (0.05)	0.03 (0.04)	-0.04 (0.03)	-0.13 (0.11)
P value	0.93	0.40	0.26	0.21
Cadmium ≥ 0.03	-0.09 (0.04)	-0.04 (0.04)	-0.04 (0.03)	-0.15 (0.10)
P value	0.05	0.27	0.17	0.15
Cobalt ≥ 0.05	-0.02 (0.05)	0.04 (0.04)	-0.06 (0.03)	-0.15 (0.11)
P value	0.62	0.34	0.05	0.16
Chromium ≥ 0.31	-0.03 (0.04)	-0.004 (0.04)	-0.03 (0.03)	-0.07 (0.10)
P value	0.44	0.92	0.32	0.48
Copper ≥ 4.5	-0.12 (0.04)	-0.05 (0.04)	-0.07 (0.03)	-0.28 (0.10)
P value	0.004	0.19	0.02	0.004
Iron ≥ 53.9	-0.002 (0.05)	-0.002 (0.04)	-0.0001 (0.03)	-0.04 (0.12)
P value	0.97	0.96	0.99	0.73
Mercury ≥ 0.03	-0.05 (0.05)	-0.03 (0.04)	-0.02 (0.04)	-0.08 (0.12)
P value	0.37	0.52	0.59	0.49
Manganese ≥ 1.1	-0.14 (0.05)	-0.06 (0.04)	-0.08 (0.03)	-0.35 (0.10)
P value	0.002	0.15	0.02	0.001
Molybdenum ≥ 0.02	-0.03 (0.04)	-0.06 (0.04)	0.03 (0.03)	0.03 (0.10)
P value	0.57	0.10	0.30	0.76
Nickel ≥ 15.2	0.04 (0.05)	0.07 (0.04)	-0.03 (0.03)	-0.05 (0.11)
P value	0.45	0.07	0.30	0.64
Lead ≥ 1.2	-0.02 (0.05)	-0.07 (0.04)	0.05 (0.04)	0.10 (0.12)
P value	0.73	0.12	0.18	0.42
Antimony ≥ 0.14	-0.01 (0.05)	-0.001 (0.04)	-0.01 (0.04)	-0.08 (0.12)
P value	0.84	0.98	0.75	0.51
Selenium ≥ 0.88	-0.07 (0.05)	-0.12 (0.04)	0.05 (0.04)	0.04 (0.12)
P value	0.18	0.003	0.16	0.72
Tin ≥ 0.27	0.04 (0.05)	0.01 (0.04)	0.04 (0.03)	0.14 (0.11)
P value	0.36	0.88	0.25	0.19
Vanadium ≥ 0.02	-0.09 (0.04)	-0.08 (0.04)	-0.004 (0.03)	-0.10 (0.10)
P value	0.04	0.02	0.89	0.35
Zinc ≥ 98.8	-0.05 (0.05)	-0.04 (0.04)	-0.01 (0.03)	-0.06 (0.11)
P value	0.33	0.34	0.84	0.57

^a Adjusted for sex, age (continuous, years), body mass index (continuous, kg/m²), height (continuous, centimeters), community area (adjacent, comparison), and school.
P value <0.1 shown in bold text.

Supplemental Table S3. Associations between toenail metals concentrations and percent predicted pulmonary function parameters among children with asthma (n=39)

Exposure (µg/g)	FEV1 % ^a	FVC % ^a	FEV1:FVC % ^a	FEF 25-75% ^a
	β (SE)	β (SE)	β (SE)	β (SE)
Adjacent Community	0.58 (5.4)	-2.8 (4.7)	2.8 (4.0)	2.1 (12.3)
P value	0.91	0.55	0.47	0.86
Aluminum ≥ 13.4	-3.5 (4.0)	0.53 (3.5)	-3.8 (2.9)	-6.9 (9.2)
P value	0.39	0.88	0.19	0.45
Arsenic ≥ 0.15	-1.5 (3.9)	2.0 (3.4)	-3.1 (2.8)	-11.5 (8.8)
P value	0.70	0.57	0.27	0.19
Cadmium ≥ 0.03	-6.3 (3.9)	-3.5 (3.4)	-2.4 (2.9)	-11.4 (8.9)
P value	0.11	0.30	0.40	0.20
Cobalt ≥ 0.05	-0.81 (4.1)	3.7 (3.5)	-4.6 (2.9)	-5.0 (9.2)
P value	0.84	0.29	0.11	0.59
Chromium ≥ 0.31	-3.2 (3.9)	0.48 (3.4)	-3.2 (2.8)	-6.1 (8.8)
P value	0.41	0.89	0.25	0.49
Copper ≥ 4.5	-9.0 (3.8)	-3.7 (3.4)	-5.4 (2.8)	-20.6 (8.5)
P value	0.02	0.29	0.05	0.01
Iron ≥ 53.9	-1.3 (3.9)	0.12 (3.3)	-1.4 (2.8)	-7.2 (8.7)
P value	0.74	0.97	0.63	0.41
Mercury ≥ 0.03	-0.61 (4.0)	-1.2 (3.5)	0.77 (3.0)	2.1 (9.2)
P value	0.88	0.72	0.79	0.82
Manganese ≥ 1.1	-9.1 (3.9)	-3.3 (3.6)	-5.4 (2.9)	-24.9 (8.6)
P value	0.02	0.36	0.06	0.004
Molybdenum ≥ 0.02	-3.0 (4.0)	-6.2 (3.3)	3.3 (2.8)	0.85 (9.0)
P value	0.44	0.06	0.24	0.92
Nickel ≥ 15.2	2.0 (4.0)	6.4 (3.3)	-4.5 (2.8)	-7.3 (9.0)
P value	0.62	0.05	0.11	0.41
Lead ≥ 1.2	-0.28 (4.2)	-5.2 (3.5)	5.3 (2.9)	7.6 (9.4)
P value	0.94	0.14	0.07	0.42
Antimony ≥ 0.14	-0.41 (4.4)	2.3 (3.8)	-1.5 (3.2)	-6.8 (10.0)
P value	0.92	0.55	0.63	0.49
Selenium ≥ 0.88	-3.6 (4.3)	-8.8 (3.5)	5.3 (3.0)	4.8 (9.8)
P value	0.40	0.01	0.08	0.62
Tin ≥ 0.27	1.7 (3.8)	-2.3 (3.3)	4.2 (2.7)	8.3 (8.6)
P value	0.66	0.48	0.12	0.33
Vanadium ≥ 0.02	-8.6 (3.8)	-8.0 (3.2)	-0.39 (2.9)	-8.2 (9.0)
P value	0.02	0.01	0.89	0.36
Zinc ≥ 98.8	-4.4 (4.2)	-2.9 (3.6)	-1.3 (3.1)	-8.5 (9.5)
P value	0.29	0.42	0.67	0.37

^a Adjusted for body mass index (continuous, kg/m²), height (continuous, centimeters), community area (adjacent, comparison), and school.

P value <0.1 shown in bold text.

Supplemental Table S4. Associations between toenail metals concentrations and percent predicted pulmonary function parameters among children with asthma (Hispanic only; n=35)

Exposure (µg/g)	FEV1 % ^a	FVC % ^a	FEV1:FVC % ^a	FEF 25-75% ^a
	β (SE)	β (SE)	β (SE)	β (SE)
Adjacent Community	2.1 (5.9)	-0.65 (5.0)	2.5 (4.4)	1.7 (13.6)
P value	0.72	0.90	0.56	0.90
Aluminum ≥ 13.4	-3.1 (4.3)	1.5 (3.7)	-4.2 (3.2)	-6.8 (10.0)
P value	0.47	0.69	0.18	0.50
Arsenic ≥ 0.15	0.07 (4.3)	3.6 (3.7)	-2.9 (3.2)	-10.3 (10.0)
P value	0.99	0.32	0.36	0.30
Cadmium ≥ 0.03	-6.6 (4.1)	-3.6 (3.6)	-2.6 (3.2)	-11.3 (9.8)
P value	0.11	0.31	0.42	0.24
Cobalt ≥ 0.05	-0.37 (4.3)	4.6 (3.6)	-4.9 (3.1)	-4.5 (10.0)
P value	0.93	0.20	0.11	0.65
Chromium ≥ 0.31	-3.3 (4.2)	-0.002 (3.6)	-2.9 (3.1)	-5.6 (9.7)
P value	0.43	0.99	0.35	0.56
Copper ≥ 4.5	-9.9 (4.0)	-4.9 (3.6)	-5.3 (3.1)	-21.6 (9.4)
P value	0.01	0.17	0.09	0.02
Iron ≥ 53.9	-1.4 (4.2)	-0.74 (3.6)	-0.78 (3.1)	-6.7 (9.7)
P value	0.74	0.84	0.80	0.49
Mercury ≥ 0.03	-0.85 (4.5)	-0.54 (3.8)	0.03 (3.3)	0.80 (10.4)
P value	0.85	0.89	0.99	0.94
Manganese ≥ 1.1	-11.5 (4.3)	-5.7 (3.9)	-5.7 (3.4)	-28.9 (9.9)
P value	0.008	0.15	0.09	0.004
Molybdenum ≥ 0.02	-2.6 (4.2)	-5.4 (3.5)	3.3 (3.1)	0.44 (9.8)
P value	0.54	0.12	0.29	0.96
Nickel ≥ 15.2	2.5 (4.3)	6.6 (3.5)	-4.2 (3.1)	-6.8 (9.9)
P value	0.56	0.06	0.17	0.49
Lead ≥ 1.2	0.35 (4.6)	-5.3 (3.8)	6.2 (3.3)	10.2 (10.6)
P value	0.94	0.17	0.06	0.34
Antimony ≥ 0.14	-2.1 (4.7)	0.77 (4.0)	-1.9 (3.5)	-9.5 (10.9)
P value	0.66	0.85	0.58	0.38
Selenium ≥ 0.88	-5.1 (4.5)	-10.8 (3.5)	5.5 (3.3)	3.0 (10.8)
P value	0.26	0.002	0.10	0.78
Tin ≥ 0.27	4.4 (4.2)	-0.21 (3.6)	5.1 (3.0)	10.9 (9.7)
P value	0.29	0.95	0.09	0.26
Vanadium ≥ 0.02	-8.7 (4.0)	-8.0 (3.4)	-0.36 (3.2)	-7.9 (9.8)
P value	0.03	0.02	0.91	0.42
Zinc ≥ 98.8	-4.1 (4.5)	-3.1 (3.9)	-0.77 (3.4)	-8.2 (10.6)
P value	0.37	0.42	0.82	0.43

^a Adjusted for body mass index (continuous, kg/m²), height (continuous, centimeters), community area (adjacent, comparison), and school.

P value <0.1 shown in bold text.

Supplemental Table S5. Associations between toenail metal concentrations and asthma control among children with asthma (Hispanic only; n=70)

Exposure (µg/g)	Uncontrolled ACT ≤ 19 (n=16)	Controlled ACT >19 (n=55)	OR (95% CI) ^a
	N (%)	N (%)	
Adjacent Community	9 (56.3)	26 (48.1)	1.3 (0.4, 4.5)
Aluminum ≥ 12.3	10 (62.5)	23 (42.6)	2.3 (0.9, 6.0)
Arsenic ≥ 0.15	10 (62.5)	24 (44.4)	1.8 (0.6, 5.9)
Cadmium ≥ 0.03	9 (56.3)	24 (44.4)	1.5 (0.5, 4.7)
Cobalt ≥ 0.04	10 (62.5)	23 (42.6)	2.5 (0.7, 9.6)
Chromium ≥ 0.29	9 (56.3)	26 (48.1)	1.3 (0.2, 10.0)
Copper ≥ 4.5	12 (75.0)	24 (44.4)	4.5 (1.0, 20.4)
Iron ≥ 51.2	11 (68.8)	25 (46.3)	3.2 (0.8, 12.2)
Mercury ≥ 0.03	9 (56.3)	25 (46.3)	1.8 (0.4, 6.9)
Manganese ≥ 1.1	9 (56.3)	26 (48.1)	1.1 (0.3, 4.3)
Molybdenum ≥ 0.02	10 (62.5)	22 (40.7)	2.6 (0.7, 8.9)
Nickel ≥ 13.4	12 (75.0)	23 (42.6)	7.3 (1.9, 28.2)
Lead ≥ 1.2	9 (56.3)	25 (46.3)	1.6 (0.6, 4.3)
Antimony ≥ 0.14	10 (62.5)	23 (42.6)	2.1 (0.7, 6.6)
Selenium ≥ 0.87	6 (37.5)	28 (51.8)	0.5 (0.1, 1.6)
Tin ≥ 0.27	7 (43.7)	27 (50.0)	0.6 (0.2, 1.3)
Vanadium ≥ 0.02	9 (56.3)	24 (44.4)	1.5 (0.7, 3.3)
Zinc ≥ 96.8	9 (56.3)	26 (48.1)	1.6 (0.4, 6.9)

^a Adjusted for sex, age (continuous, years), body mass index (continuous, kg/m²), community area (adjacent, comparison), and clustering by school.
P value <0.1 shown in bold text.