Supplementary material

Chemical Element Mixtures and Kidney Function in Mining and Non-Mining Settings in Northern Colombia

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Table S1. Certified standards for trace elements concentration in human hair.

Denominations	Company. Reference. Bath	Elements (Concentrations)
Multielement standard Solution 5 for ICP. TraceCERT	Sigma Aldrich 54794-100mL (BCBT5551)	27 elements in nitric acid 5% Li, Be, Na, Mg, Al, K, Ca, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Rb, Sr, Mo, Ag, Cd, Cs, Ba, Tl, Pb, Bi, Hg
ICP multielement standard Solution X Certipur	Merck 1.09493.0100 (HC856557293)	23 elements in diluted nitric acid Be, B, Na, Mg, K, Ca, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Sr, Mo, Cd, Ba, Tl, Pb, Bi
Environmental Calibration Standard	Agilent. Part #5183-4688. (Lot#: 1-190YJY2	22 elements in nitric acid 5% Na, Mg, Al, K, Ca, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Se, Mo, Ag, Cd, Sb, Ba, Tl, Pb,
Mercury ICP/MS standard CertiPUR	Merck 1.70333.0100 (hc02450533)	Hg 1000 mg/L. Very high concentration, Prepared Stock diluted at 10 mg/L
Aluminium ICP standard CertiPUR	Merck 1.70301.0100 (OC554360)	Al (as Al(NO3)3) in nitric acid 3% (Uses for confirmation purpose)
Scandium ICP/MS standard CertiPUR	Merck 1.70369.0100 (HC631658)	Sc 1000 mg/L in HNO3 7% Sc as Sc2O3). (Used as internal standards)
Ytrium ICP/MS standard CertiPUR	Merck 1.70369.0100 (HC631658)	Y 1000 mg/L in HNO3 7% Sc). (Used as internal standards)
Standard of high concentration of Na-K-Mg-Ca	Prepared in the lab from analytic grade reagents	Used to confirm cases with concentrations higher than 100 mg/L.

Table S2. Limit of quantification (LOQ) and experimental values of trace elements concentration in the certified reference material of human hair.
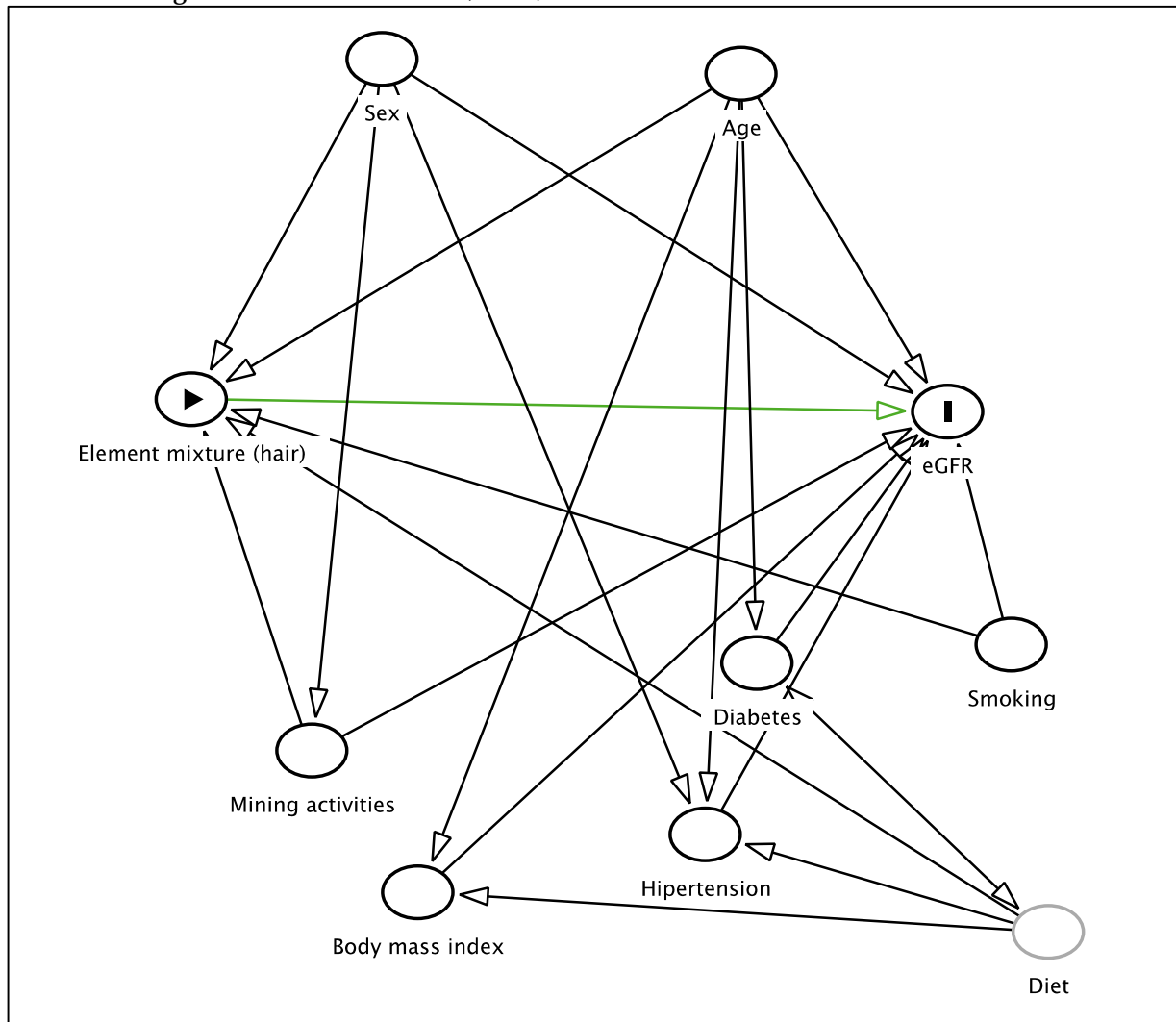
Certificate material	Element	LOQ (ppb)	Experimental value (ppb) M ± SD	95% Confidence Interval
NCS DC 73347 a	Na	11	78,23 ± 5,82	61 – 117
	Ba	0,02	12,03 ± 0,33	10 – 12.8
	Hg	0,01	0,463 ± 0,006	0,44 – 0,9
	Tl	0,001	0,0068 ± 0,0003	0,0051 – 0,010
	Bi	0,001	0,019 ± 0,001	0,016 – 0,026
	V	0,01	0,32 ± 0,02	0,09 – 0,91
	Fe	0,5	28,9 ± 2,1	24 - 48
	Cr	0.01	0,12 ±0,01	0,13 – 0,69
	Co	0.01	0.026 ± 0.002	0.024 – 0.066
	B	0.030	2,39 ± 0.15	1,75 – 4,05
	Be	0,001	0,1045± 0,003	0,094 – 0,126
IAEA 086	Mn	0,02	9,98 ± 0,3	8,8 ± 10,4
	Mg	0,5	162,42 ± 10	150 - 200
	Ca	29	1127 ± 35	1010 - 1230
ERM DB001	Cu	0,04	28,9 ± 2,2	24 - 42
	As	0,01	0,038 ± 0,02	0,03 – 0,06

	Pb	0,01	1,98 ± 0,02	1,7 – 2,6
NIES 13	Zn	0,2	170 ± 16	146 - 197
	Sb	0,01	0,034 ± 0,003	0,024 – 0,060
	Se	0,01	2,08 ± 0,2	1,4 – 2,2
	Ag	0,01	0,12 ± 0,03	
	Cd	0,01	0,24 ± 0,05	0,16 – 0,30

Table S3. Characteristics of participants who complete and did not complete clinical medical interview

Characteristic	Complete clinical assessment n=133	Missing from clinical assessment n=66	p value
Male (n-%)	75 (56.39)	44 (66.67)	0.164
Age (mean-SD)	43.51 (11.21)	40.57 (13.43)	0.133
Mining activities (n-%)	59 (44.36)	30 (46.15)	0.812
Current smoker (n-%)	10 (7.52)	6 (9.09)	0.701
BMI (mean-SD)	26.94 (3.79)	27.05 (4.04)	0.549
eGFR mL/min/1.73m2 (mean-SD)	87.95 (13.09)	90.13 (14.46)	0.348

Figure S1. Direct Acyclic Diagram (DAG) of the causal association between element mixtures in hair and estimated glomerular filtration rate (eGFR)