

Supplemental Material

Characterization of bone aluminum, a potential biomarker of cumulative exposure, within an occupational population from Zunyi, China

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1. Distinct exposure groups

Cumulative exposure indices (CEIs) for aluminum (Al) were created using the distinct exposure group method [1]. The following section offers a rationale behind where each exposure group was placed. Reported job titles or descriptions were allocated to 1 of 3 exposure groups: low exposure (group 1); moderate exposure (group 2); and high exposure (group 3). More details are presented in Table S1, below.

The exposure group category for a participant's current job was based on job title and the factory location (whether in the factory or office building). Previously published aluminum (Al) exposure data for similar job titles in the literature were used to determine group assignment, where possible (see Table S1). Individuals in group 1 worked in the office building of the manufacturing or ferroalloy facility. Job titles in group 2 included individuals that moved between the factory and office building of the manufacturing facility (including managers) and individuals in the electrolysis processing area of the ferroalloy factory. Group 3 was comprised of workers in the factory area of the manufacturing facility, mineral ore processing area and liquid processing area of the ferroalloy factory. The same placement was used for previous job titles that were the same or similar to a current job title and factory. Placement of individuals with prior jobs that were not in either factory included in the study was determined by consulting previously reported exposure assessment data (see Table S1).

Table S1: Job titles and/or descriptions included in distinct exposure groups

Group 1 (low exposure)	Group 2 (moderate exposure)	Group 3 (high exposure)
Administrator ^a	Cleaner [10]	Arc welder ^c
Advertising/marketing [2,3]	Die-casting hardware [11]	Assembler ^{b,c}
Assembler/ equipment assembler/ metal product assembler ^{b,c}	Director/ manager ^{d,e,f,g}	Welder ^c
Brick carrier	Equipment management/manufacture/repair [12]	Welder and machine repair ^{e,g}
Car repair	Factory worker	Smelter
Cement factory worker [4]	Fire-resistant material worker [13]	
Charting ^b	General worker	
Construction worker	Janitor ^a	
Designer ^b	Machine repair ^{e,g}	
Driver [5]	Maintenance ^f	
Equipment/machine processing ^a	Manganese worker ^{e,f,g}	
Lime processing [6]	Metal product assembler	
Machine designer ^b	Miner/ part-time miner [12]	
Metal processing	Production manager ^g	
Machine operator	Refinery	
Security	Stripping [14]	
Private business	Vegetable storage manager ^g	
Quality inspector [7]		
Road construction		
Secretary		
Security and environmental protection		
Sewage treatment [8]		
Stevedore		
Weeding		
Wireman [9]		

^a Office building in the ferroalloy facility, ^b Office building in manufacturing facility, ^c factory area of the manufacturing facility, ^d moved between the factory and office building of the manufacturing facility, ^e mineral ore processing area in the ferroalloy factory, ^f electrolysis processing area in the ferroalloy factory, ^g liquid processing area in the ferroalloy factory.

2. Distribution of bone aluminum measurements

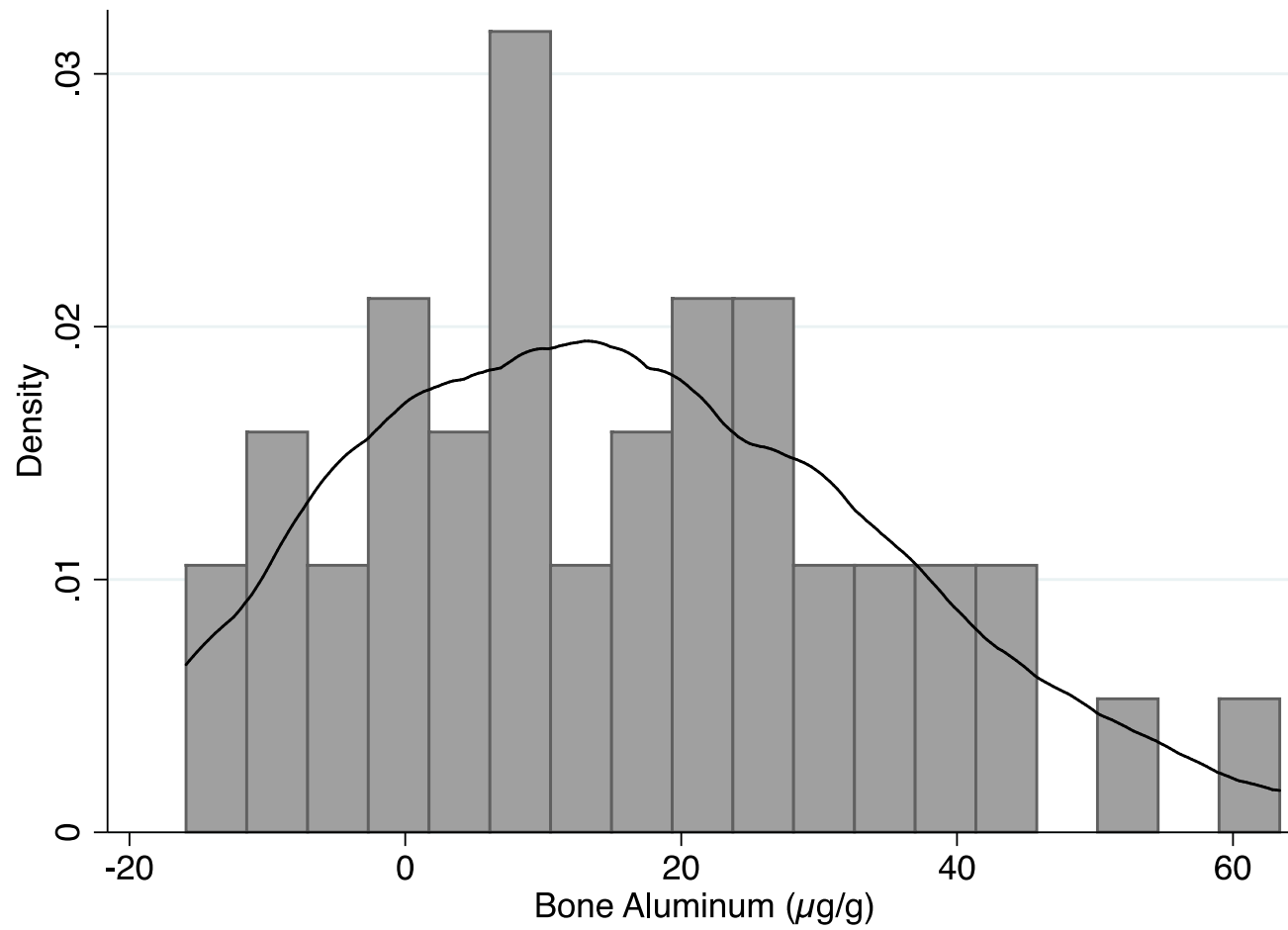


Figure S1: Density plot of bone aluminum concentrations, N=43.

Table S2: Distribution of bone aluminum (Al), $\mu\text{g/g}$ dry bone, N=43

	Mean	Standard deviation	25th percentile	50th percentile	75th percentile	Minimum	Maximum
Bone Al	15.6	18.6	0	14.9	28.1	-15.9	63.4

3. Unadjusted association of fingernail aluminum with bone aluminum and aluminum cumulative exposure indices

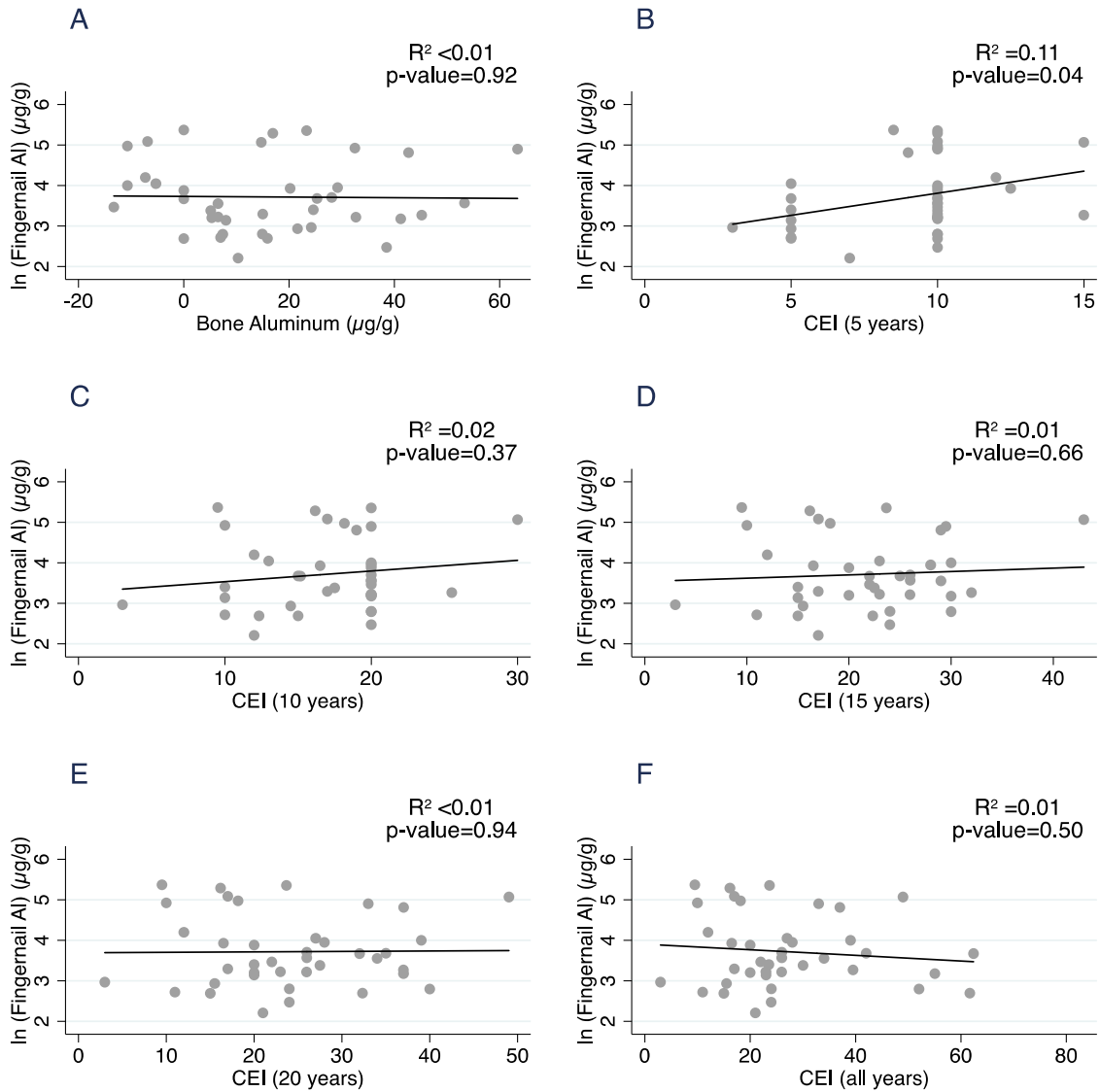


Figure S2: Scatter plot and unadjusted regression line for $\ln(\text{Fingernail aluminum})$ ($\mu\text{g/g}$) with: A: bone Al ($\mu\text{g/g}$ dry bone); B: 5 year CEI; C: 10 year CEI; D: 15 year CEI; E: 20 year CEI; and F: lifetime CEI. N=39.

4. References

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